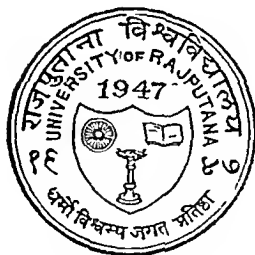


Text Books & Syllabuses

PREScribed FOR THE VARIOUS EXAMINATIONS IN THE
FACULTIES OF ARTS, SCIENCE, COMMERCE, LAW,
ENGINEERING, AND MEDICINE

OF THE
UNIVERSITY OF RAJPUTANA
FOR
1949 & 1950.



J A I P U R

UNIVERSITY OFFICE

1948

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Parani Basti Jaipur City

TEXT BOOKS & SYLLABUSES

FACULTY OF ARTS

B A EXAMINATION

GENERAL ENGLISH

There will be two papers

Paper I — Essay and Unseen

(1) An essay designed to test the powers of the student to write clearly and correctly on a subject with which he may be expected to be acquainted and (2) an unseen passage from a modern book, magazine, or newspaper designed to test the candidate's knowledge and intelligent appreciation of present day topics and his ability to write a clear *precis* together with exercises on idiom

Books recommended —

FOWLER The King's English (O U P)

FOWLER Dictionary of Modern English Usage (O U P)

MILLER Hints on the Art of English Composition in prose and verse (Gaya Prasad & Sons, Agra)

Paper II — General Composition

Subjects for short essays will be set from the following books, which are not meant for detailed study

A F SCOTT Modern essays, Second Series, 1941-43 (Macmillan & Co)
The Sections entitled 'Looking to the Future' 'Science and 'The War' only are prescribed

C K AILEY, Democracy and the Individual (O U P)

DAVID INGE Five Essays edited by E A Woodhouse and published by Longmans Green & Co Ltd

One Act Plays of To-day Series I (Harrap)

ENGLISH LITERATURE

Paper I — Shakespeare and Drama

SHAKESPEARE *A Midsummer Night's Dream* Hamlet

JOHN DRINKWATER *Abraham Lincoln* annotated by F. H. W. Spenslow (Longmans Green & Co)

Paper II — Poetry

C. B. YOUNG *Great English Poems* (O. U. P.)

The following poems are prescribed —

- | | | |
|----|------------|--|
| 1 | MILTON | <i>Lycidas</i> |
| | WATTSWORTH | <i>Lines composed near Tintern Abbey</i> |
| | do | <i>Ode on Intimations of Immortality from Recollections of Early Childhood</i> |
| 3 | SHELLEY | <i>Ode To the West Wind</i> |
| 4 | KEATS | <i>The Eve of St. Agnes</i> |
| | do | <i>Ode To a Nightingale</i> |
| 5 | Tennyson | <i>The Lotus Eaters</i> |
| 6 | BRUNNING | <i>The Last Ride Together</i> |
| | do | <i>Rabbi Ben Ezra</i> |
| | ARNOLD | <i>The Scholar Gipsy</i> |
| | THOMSON | <i>The Hound of Heaven</i> |
| 9 | CIBON | <i>Flannan Isle</i> |
| 10 | BROOKER | <i>The Great Lover</i> |
| 11 | OWEN | <i>Strange Meeting</i> |

Paper III — Prose

JOHN AILEY *Dr. Johnson and his Circle* (Home University Library O. U. P.)

SIR HUGH WALPOLE *The Prelude to Adventure* (The World's Classics Series published by the Oxford University Press)

C. I. J. CLIMBERG *Several Essays* (O. U. P.) omitting Nos. 4, 5, 6, 7 and 8 from Section IV. Essays in Criticism

Note 1 — *Passages for explanation with reference to the context will not be set forth. No discussion under Paper III.*

Note 2 — *Candidates will be expected to show familiarity with the principal metrical forms of English verse.*

The following books are recommended —

MAYOR	Modern English Metre (C U P)
EGERTON SMITH	Essay writing, Rhetoric and Prosody (O U P)
HOLME	English Prosody for Indian Students and Teachers (Longmans Green & Co)

L R M BRANDER Rhetoric and Prosody (O U P)

Note 3 - Candidates are expected to show some acquaintance with the main outlines of the history of English Literature during the periods covered by the prescribed texts

The following books are recommended —

EMILE LEGOUIS	A Short History of English Literature (O U P)
BERNARD GROOM	A History of English Literature (Longmans Green & Co)
MAIR	Modern English Literature (Hohne Univ Library)
STOPFORD BROOKE	A Primer of English Literature (Macmillan)
B P BAGCHI	Pages from the History of English Literature (published by Har Prasad Bhargawa, Agra)
G E HOLLINGWORTH	A Primer of Literary Criticism (Univ Tut Press)
GILKES	A key to Modern English Poetry (Blackie & Sons Ltd)
PLANDLEBURY	English Lyrical Types (Blackie)

ARABIC

Paper I Texts -Selections in Arabic Prose and Verse, approved by the Allahabad University (Anwar Ahmadi Press, Allahabad)

Omit Selection from

کتاب الشعراء and مقامات ندوی

first 8 maqamat (Mujtabai Press, Delhi)

ادب العرب اور مولوی رحمت احمد

Paper II — Grammar (up to the end of Khassiyat 1. Abwab and

Questions on Grammar will be set in both the papers

Vol 2 - Questions on / summary: It is included in this paper

Paper II.—Poetry

(1) قصائد حافظی

(1) دل میں پیر تعلیم اسب و من طفل رساندش

بہار و مردہ حادش (ii) نہ چوں حیپال حادش (i) *excluding*

رمیں (v) سگ میائے حادش (iv) تعلیم المای سنانش (iii)

دایہ پستانش

(2) صلحدم چوں کله ندداد درد اساعے من

چشمہ صاب احراے من (ii) چوں والے من (i) *excluding*

(iii) استعراے من (کرده)

—قصائد انوری (2)

(1) اے فاعده قارہ ردست تر کرم را

(2) حرم حر رشید ہو از حرب در اید بحمل

قصائد عری (3)

(1) اے مقام درد دو نارار حار انداخته

(2) اقبال کرم می کرد ارباب معجم را

قصائد بیسی (4)

(1) یا ازل الطہور یا اندی العفا

(2) اے بعد عقل و شرع اداہم چه کرہی

قصائد فانی (5)

(1) اسیم حلدہمی ررد مکرر حولیارها

(2) سروش و حد تم در گوش هوش اعد خطاب

رند و عجم (6)

صحنہ اختر

۹ اے کہ رمی زبردہ گرمئی او و مالہ را

۲۶ اس جہاں چہیست صم حانہ پندار مست

۹۷ فرصت کشمش عده اس دل بیقرار را

۸۹ اے این چمن اردہ رنگست ہر

۱۰۰ نکید ہو صحت و اعجاز بیاں بیز کنند

- ۱۱ - ترسیده ترچه پروں از طلسم ایلیک است
 ۱۲۶ - از چه کس کناره گداز صحنه آفتاب
 عرلاب عراقی (7)

- ۱ - استغفرتی ناله کالندر خام کو د
 ۲ - نه سواره بلند درون از خردک عالمی
 ۳ - در سو معده نه گشتن رند سرب حاله
 عرلاب مدنی (8)

- ۱ - پس ما رسم سکستی برد عهد و را
 ۲ - بیا که نوبت صبح است و روزگار سبب
 ۳ - در می این آب دشت و در می دور
 عرلاب حانط (9)

- ۱ - دوس و صبح سحر از صبح بعام دادند
 ۲ - دوس دندم نه مدگی دو مدعا زدند
 ۳ - دین ناعم سر نرس جهان یک روی آورد
 عرلاب عمری (10)

- ۱ - دوستدارو نه علمت بد در جان ما
 ۲ - روان رنگه روماند و وار می نا
 ۳ - از دنده نم کدام نفس خون نمی رود
 عرلاب استوری (11)

- ۱ - از لب نمی دهد دل آسان روده را
 ۲ - بر دندم مرا کار نا ل افتاد
 ۳ - حه خرس نه از در یکدل سر حرت اگزرس
 عرلاب اب (12)

- ۱ - عشق دکان نار نبوس ر در گز می کشد
 ۲ - ناد مطاب می رسو حوائی کلم استه اه ته
 ۳ - نه مهر این عمر و گرمی و اگزرس
 عرلاب و طالب گنم (13)

- ۲-ار ثنات عشق دالم پا نه دامی داشتم
۳-نه همین می دمدآن بو کل حدس ار می

عریات غالب (14)

- ۱-اے کہ کہتم بدهی داد دل ارے بدهی
۲-خوش بود فارغ رسد کھر و ایمان رستی
۶-یارب ر حنون طرح عے در نظرم دیر

مثنوی سکندر نامه نظامی (15)

۱-اصل

۲-مناجات

۳-نعت

۴-پنروری یانقی اسکندر بر دارا و کشته شدن دارا

Note 1 — Questions on Rhetoric will be included in this paper

Note 2 - A general sketch of the History of Literature with reference to the authors prescribed in the text is particularly expected

For the History in Literature 'An Outline History of Persian Literature by A H Faridi (Ram Prasad and Bros Agra) and "Maasir i-Ajam by Mohammed Azimul Haq Junaidi (Shih & Co Agra) are suggested

Paper III ---Rapid Reading and Translation

Adabiyat-i Ajam, Part III (Revised edn 1943) published by (Ram Prasad and Sons Agra)

Students who offer Persian are required to have such knowledge of the Etymology of the Arabic language as will enable them to explain all Arabic words and phrases which may occur in the text books and in the books recommended for Rapid Reading in Persian

Note ---Persian words must be written in Persian character

SANSKRIT

Paper I --- Poetry and Drama

- (i) KALIDASA, Abhijnana Sakuntalam
(ii) Bharavi Kirtarjuniya, Canto II

Paper II Prose History of Literature and *either* Rhetoric or Elements of Hindu Culture

- (i) Sanskrit Gadya Manjarī (Gautam Bros & Co Kanpur)
- (ii) *History of Sanskrit Literature* dealing with the Epics the Iavyas Iyric Poetry Drama Fairy Tales and Fables

Books recommended--

KLITH Classical Sanskrit Literature (Heritage of India Series)
Sanskrit Sahitya ki Ruparekha published by Sahitya Niketan
Kanpur

MCDONELL History of Sanskrit Literature Chapters X XIV and
XVI

PENDSE संस्कृत वाङ्मयाचा इतिहास

(iii) *Fuller*

Elementary knowledge of Alankaras from Kavya Dipika Astam Shilpi
(excluding Astam Shuka loka)

or

Elements of Hindu Culture

(1) The Family The Sanskaras and Ashramas food clothes and
ornament house and furniture

(2) Community The Varnas and caste

(3) Society —Economic Life means of livelihood

Property—Possession and ownership—

Agriculture Industry Trade Commerce Coinage Origin of writing

(4) Political Organisation Sources of Revenue Spiritual and
Temporal Power

Kingdom and Republics Machinery of Government Royal
Officers Assemblies

Administration of Justice and punishments

Books recommended

IKHARVIA Elements of Hindu Culture and Sanskrit
Civilisation

MURPHY (RABHATULU) Hindu Civilization

Paper III Composition Translation and Rapid Reading

Bhasa Svapnavasavadattam

Dr RAGHURAN Valmiki Ramayan (abridged) Published by G A
Nateeram Madras,

*Students should be taught to study these books by themselves with the help
of a Sanskrit English dictionary*

Books recommended for Translation and Composition

CHARUDEVA Manual of Translation

Dr MANGAL DEV Prabandha Prakasa

V S APTE Guide to Sanskrit Composition

GENERAL

Grammar books recommended

KOLE or KEILHORN Higher Sanskrit Grammar

(1) General questions on Grammar will be set in Paper I only and
not more than 10 per cent of marks in that paper shall be allotted to
them

(2) Explanation in Sanskrit or in *Tika* form should be confined to
books on poetry under Paper I, and marks, not more than 15 percent of
marks in that paper, may be allotted to it

(3) Sanskrit must be written in Devanagari Character

MODERN INDIAN LANGUAGES

HINDI

Paper I —Prose and Drama Texts

JAI SHANKER PRASAD Dhruvaswamini

RAM CHANDRA SHUKLA Triveni

(N P, Sabha Kashi)

HARIHAR NATH TANDAN Lekhmala

(Gaya Prasad & Sons Agra)

PRIM CHAND Premashram

Books recommended—

JANARDAN PRASAD JHA Prem Chand ki Upanyas kala

MANAVA Khari Boli ke Gaurava Granth

BRAHM DUTT SHARMA Hindi Sahitya men Nibandh (Gaya Prasad
& Sons, Agra)

PRIM NARAIN TANDAN Prem Chand aur Gramsamasya

Paper II —Poetry Texts

JAGANNATH TIWARI Sanskrit Ram Chandrika
(Gaya Press & Sons Agra)

MUNSHI RAM SHARMA Sur Shatak
(Shukla Sadhana Mandir Kanpur Price Rs 1 8)

SHRIDHAR PANT Tulsī Prabha
(Lakshmi Narain & Sons Agra)

SOM NATH GUPTA Prabandh Kavya Sangrah
(Indian Press Ltd Allahabad Price Rs 1 8)

The following syllabus is prescribed in Rhetoric —

(a) अलंकार—

(i) शब्दालंकार—यक्रांति, अनुमास, यमक, श्लेष ।

(ii) अर्थालंकार—उपमा, पुरुषोपमा, सुसोपमा, मालोपमा, प्रतीप, रूपक, श्लेष, स्मरण, भ्रान्ति, सन्देह, अनुप्रास, उपमेयता (वस्तु, हेतु, फल), अतिशयोक्ति, शीघ्र, निदर्शनातिरिक्त, सशक्ति, परिचयानुर, अप्रस्तुतप्रशंसा (अन्वयति), विभावना, असंगति, यथासंख्य या वृत्त, परिचयता, अथांतरयास, इष्टान्त, मुद्रा, तद्गुण, भालित और उमालित ।

(f) रस—रस और भव—

रस निर्वाचन (विभाव, अनुभाव, संचार)

(c) दाप—धुतिकदुर, व्युत्पत्ति, अस्मिता, अप्रतीत्य, माम्यत्व, तिष्ठत्व, न्याय्यत्व, अधिक पद, अक्रम, पुनर्नि और दुष्कर्म ।

Books recommended—

RAM KRISHNA SHUKLA Sukavi Samit sha

S S Das Hindi Sahitya

I A I KRISHNA SHUKLA Kavya jana

KRISHNA SHANKAR SHUKLA Keshava ki kavyakala
(Sahitya (ranthmala Karyalaya Kashi)

Paper III —Translation and Composition

Translation from English into Hindi and Composition

Book recommended—

RAM CHANDRA VERMA Achcha Hindi (Devanagiri Edition Sahitya Ratna
Mala Karyalaya Penare—1911 1 2)

URDU

Paper I—Prose.

(۱) نقش نامید—ار پروویسر معنوں گورکھپوری سیت اینڈرور کالم گورکھپور۔

(۲) اردو نثر کے نمونے مولانا پروویسر محمد طاہر فاروقی۔ شائع کردہ شاہ لیتھ کمپنی۔ حکیم وصی روتہ اکرہ۔

(۳) دہلی کی ادبی شمع ار مولانا رحمت اللہ بیگ۔

(۴) بیرنگ حنال حصہ اول صفحہ مولانا اراد دہلوی۔

Paper II—Poetry

(a) Marsia,

(۱) مرثیہ ایس ”پہولشعق سے چرخ
پہ حب لالہ رار صبح“ ار کمال ایس“ مرثیہ۔
حامد حسن قادری شائع کردہ گیانپرشاد اینڈ سس پبلشر اکرہ

قصائد و حرلیات (b)

(۲) دامن گلچس شائع کردہ گیانپرشاد اینڈ سس، اکرہ
(c) Modern Poetry,

(۳) حصر راہ {
(۴) طالع اسلام ار ڈاکٹر سر اقبال۔

Books to be consulted—

(۱) ائمہ ادبی رحمانات ار سیڈ اعجاز حسن۔

(۲) تاریخ و تقلد ادبیات اردو صفحہ حامد حسن قادری۔ مطبوعہ

Lakshmi Narain Agarwal, Agra

(۳) صحیفہ تاریخ اردو مرثیہ محمود اکبر آبادی
شائع کردہ گیانپرشاد اینڈ سس پبلشر اکرہ۔

(۴) اردو کے اسالیب بیان صفحہ ڈاکٹر سید معنی الدین، ادبی۔

(۵) عا عرس صفحہ نواب احسان علی اب ناندہ۔ مطبوعہ دہلی پریس
لکھنؤ۔

(ملے با پتہ، شاہ لیتھ کمپنی۔ حکیم وصی روتہ اکرہ)

(۶) داستان نارنج اردن سابع کردہ

Lakshmi Narain Agarwal, Agra

(۷) نندنی اسارے ار آل احمد سرور -

(۸) انفال ار پرو دسر معلوں گورکھ ری - سنت اسٹ روز کالج گورکھپور

(۹) نندنی حائرے ار سند احتسام حسن پرو دسر لکھنؤ پرو دسر سی -

Note - (a) *The evolution of Ghazal in its various branches (mystic philosophic didactic lyric etc) should be studied*

[b] *Questions on the general History of Literature and criticism of the authors studied will be set in both Paper I and II*

[c] *Candidates will be expected to know the peculiarities of the dialect (Lucknow or Delhi) in which each work is written and the distinctive feature and merits of each writer*

Paper III - Translation and Composition

(a) Translation from English into Urdu

(b) Essay in Urdu

Note - The following book is recommended to suggest the type of the English passages for translation into Urdu

Selected English pieces for Urdu Translation

(Gaya Prasad & Sons Agra)

PHILOSOPHY

There will be three papers -

Paper I - Psychology

Either -

(a) *General Psychology* -

I The Problem Data and Methods of Psychology The Branches of Psychology

II Empirical facts about the relation of Body and Mind

III The general characteristics of Mental Life The different Levels of Consciousness

IV Intelligence its nature Methods of testing Intelligence

V Learning, animal and human Learning by Trial and Error Learning by Imitation Learning by Insight Formation and breaking of Habit

VI Attention its nature and relation to Consciousness Kinds of Attention Conditions of Attention

VII Perception and Sensation The nature and characteristics of Perception Illusions and their causes

VIII Memory Learning Retention, Recall, Recognition, Percept and Memory image

IX Imagination Kinds of Imagination, Hallucinations and Delusions Day Dreams Dreams Freud's theory of Dreams

X Thinking Factors of advantage in Association Reasoning

XI Feeling and Emotion Emotion and Instinct, Emotion and its expression The James Lange theory of Emotion, Moods Sentiments and Complexes

XII Conation Reflex Acts Conditioned Reflexes Random Acts, Instinctive Acts, Ideo Motor Actions Voluntary Actions

XIII Personality Psycho analysis The Unconscious or Subconscious Mind

Books recommended

R S WOODWORTH Psychology (Fifteenth Edn)

ANGELL Psychology Revised edition

And *Further* (i) Social Psychology (ii) Child Psychology

(i) Social Psychology—

1 The nature and scope of Social Psychology

2 Instincts Imitation Suggestion and sympathy in Society Nature source and kinds of Suggestion Conditions of Suggestibility

3 The functions of Person and Will in the Individuals and Society

4 The Group Mind The General Will Different Theories

5 The Crowd Mind Deliberative Group Mind

6 Tradition Custom Law Fashion

7 Community Associations and Institutions

8 The Public and Opinion

Book recommended—

GINSBERG —The Psychology of Society (Methuen London)

Or

(ii) Child Psychology

1 The Scope and Method of Child Psychology

2 Stages of bodily and mental development of the Child
Adolescence

3 Heredity and Environment Nature and Nurture

4 Native Behaviour Reflexes Instincts General Innate Tendencies
Imitation Suggestion Sympathy Play
Method of modifying innate tendencies

5 Learning Manual Skill

6 The Senses and Sense Training Nature Development and Training
of the Child's Attention and Interest Perception Memory Imagination
Language Thinking and Reasoning Their differences from the mental
processes of adults

7 Development of Sentiment and Character of the Child Moral
Development

8 Subnormal and Supernormal Children Problem Behaviour
Delinquency Causes and Treatment

9 Training in Responsibility

Book recommended —

NORWORTHY AND WHITLY The Philosophy of Childhood (Macmillan)

Or

Paper I (b)—General Psychology and Experimental Psychology—

(i) General Psychology [*Syllabus the same as under (a) above*]

(ii) Elementary Experimental Work in Psychology

Note — There will be a practical examination for those offering Experimental Psychology

The scope of the experimental work is indicated by Seashore's
Elementary Experiments in Psychology by (Henry Holt &
Co)

Paper II —Ethics

1 The Problem, Scope and Methods of Ethics, Relation of Ethics to
Psychology Sociology Politics, Economics and Religion

2 Ethical concepts Good, Right, Duty, Virtue, Merit and
Responsibility

3 Psychological Basis of Ethics, Psychological analysis and
Ethical significance of Desire, Volition Motive, Intention Conduct and
Character

4 Judgments Descriptive and Appreciative Nature and object of
moral Judgment

5 Principal theories of the nature of the Moral Standard —

(a) The Standard as Law—External Law of the Tribe the Society, the
State, or God the Law of Conscience, Moral Sense, Intuitionism
the Law of Reason Ethical Doctrines of Butler and Kant

(b) The Standard as Pleasure—Hedonism, Psychological Ethical and
Evolutionary Ethical doctrines of Bentham J S Mill and Herbert
Spencer

(c) The Standard as Perfection—Ethics of Self Realization

(d) The Standard as Value—Instrumental, Value and Intrinsic Values
Principles of Organization of value

(e) Ethical doctrines of Nietzsche and Gandhi

6 Concrete Moral Life Right Duties and Virtues Justice Benevolence and Ahimsa The doctrine of Cardinal Virtues The Individual and Society Social Institutions Property Family and State The Ethical basis and functions of the State Theories of Punishment Moral Evil Moral Progress in the individual and Society

Books recommended—

MACKENZIE Manual of Ethics
W M URBAN Fundamentals of Ethics
J N SINHA A Manual of Ethics

Paper III Metaphysics—

Either (a) Western Metaphysics *or* (i) Indian Philosophy

(a) Western Metaphysics

Introduction to philosophy

1 GENERAL NATURE OF PHILOSOPHY and its relation to Science Possibility and value of the Study criticism of concepts classification and fundamental problems of Philosophy

2 COSMOLOGY OR PHILOSOPHY OF NATURE The conception of the Universe Naturalism Mechanism and Teleology the Evolution theory in Modern Science and Philosophy

3 ONTOLOGY OR PHILOSOPHY OF BEING—Monism Dualism and Pluralism Materialism Idealism and its various forms Phenomenalism Absolutism

4 PSYCHOLOGY OR PHILOSOPHY OF MIND Relation of the Philosophy of Mind to empirical psychology the concepts of Soul Self Mind and Consciousness the problem of Mind and body

5 EPISTEMOLOGY OR THEORY OF KNOWLEDGE General nature of knowledge Dogmatism and Authority Scepticism and Positivism Sensationalism Intuitionism and Mysticism the sources of knowledge Rationalism Empiricism Criticism Validity and Truth Idealism Pragmatism

VI AXIOLOGY AND PHILOSOPHY OF RELIGION Conception and relation of the absolute value Truth Beauty Goodness Theology and the concept of God Deism Pantheism and Theism

Books recommended---

G T W PATRICK Introduction to Philosophy [revised]

P M BHAMBHANI Manual of Metaphysics, may also be consulted

Or

(b) Indian Philosophy

Introduction to Indian Philosophy

I The Schools of Indian Philosophy The common characters of Indian Philosophy

II The Charavaka Philosophy Theory of knowledge Materialism Non existence of Self and God

III The Nyaya Vaisesika Philosophy Theory of Knowledge The nature of the world, Self and God The Categories Atomism

IV The Sankhya—Yoga Philosophy Prakriti and the Gunas, Evolution of Prakriti, Purusa Plurality of Purusas Atheism The place of God in the Yoga system The nature and forms of Yoga

V The Upanishads Brahman and the Cosmic Ideal and the Acosmic Ideal

VI The Vedanta Advaitavada of Sankara, Brahman, Maya, Isvara, Jiva The World appearance

Visistadvaitavada of Ramanuja Isvara Prakriti The World Books recommended for consultation (relevant chapter) —

S C CHATTERJI and D M DATTA An Introduction to Indian Philosophy (Calcutta University)

ECONOMICS

There will be two papers About half the total marks shall be allotted in each paper to general principles of Economics and the remainder to facts of Indian economic life The following syllabus is prescribed —

Paper I

1 *Introductory* Subject matter Economics as a Science and an Art Relation to other sciences Its divisions

2 *Method* — Ductive and Inductive Nature of economic law

3 *Definitions* eg utility wealth capital income production consumption value money

4 *Production* — The factors of production—land labour capital and organization (management indent ripe) Natural resources and human knowledge to use them Natural resources—agricultural mineral geographical power

5 *Land* — Factors affecting its productivity Physical features of India The Indian monsoons Division of soils

6 *Product of Indian Land* — Agricultural products and their distribution Minerals and their distribution Forest products Possibilities of water power

7 *Rural Economics* — Different land tenures Zamindari and ryotwari systems Permanent and temporary settlements merits and defect of each Consolidation of agricultural holdings Factors affecting agricultural improvement in India

8 *Labour* — Factors determining its efficiency Malthus theory of population positive and preventive checks Health and strength of the population its character and training

Indian labour — Occupation efficiency capacity and scope for training Density of population Its causes Migration Health and vital statistics Standard of living Effect of social customs

9 *Capital* — Harmonies and conflicts of labour and capital Conditions affecting the growth of capital Fixed and circulating capital Advantages of machinery

Indian Capital — Agricultural capital Roads Railways—development management economic effects Water transport Irrigation varieties Government works water rates

10 *Organization* — Distinction from labour Function Division of labour meaning advantages disadvantages limited by the extent of the market Localization of industries causes advantages disadvantages Territorial division of labour

The Law of productivity — Combination of the factors of production. The law of substitution The laws of diminishing, increasing and constant

returns with curves. The operation in agricultural and manufacturing industries. Factors affecting the operation of the Law of diminishing returns.

The scale of production — Large and small scale, advantages of each.

Industrial organization — joint stock enterprise. Various kinds of share, debentures etc. involved in each. Merits and defects of joint stock enterprise.

11 *Co operation* — Co operation in production, distribution or consumption and credit. Productive co operation. Distributive co-operation. The Co operative whole sale Society of the United Kingdom. Co operative credit purpose, rural and urban. Raiffeisen system and land banks, Schulze Delitzsch system.

Co operative credit in India — Primary societies, area of operations, liability, shares and dividend security, productive and unproductive loans, concessions from Government. Tests of efficiency and financial stability, their benefits, economic, educational, social, etc. Land banks, their need. Urban co operative societies central societies. Provincial Credit Banks. Statistics of number of societies, members, working capital.

12 *Distribution* — Problem due to group production. National dividend. Distribution as link between production and consumption. Equalization of marginal productivity. Mobility of the factors of production.

13 *Rent* — Definition. Marginal cost and rent surplus. Rent in intensive and extensive cultivation. Causes of rent. The law of rent. Factors affecting rent. Rent does not determine but is determined by price.

14 *Wages* — Marginal productivity theory. Factors determining the rate of wages. Influence of custom on real wages. Time and piece or efficiency wages. Wages Fund Theory. Peculiarities of labour as an agent of production. Trade Unions. Brief survey of trade unions in India.

15 *Interest* — Meaning, justification, gross and net interest. Rate of interest and productivity of capital. Risk and interest. Effect of mobility of capital on the rate of interest. Rate of interest and saving. Indian rate of interest, cause of variation in different areas, seasonal variation of the discount rate.

16 *Profit* — Meaning. Its relation to the rate of wages. Gross and net profits. Risk, remuneration of enterprise, surplus. How each is

determined Surplus profit and rent Turn over Profit and price Profits in India

Paper II

1 *Exchange*—Origin Sale and purchase Barter difficulties gain of exchange

Market Definition Place and time markets Causes of extension of markets Time markets daily short long and secular

Balancing of demand and supply General theory of desire and aversion their measurement Laws of variation law of utility law of disutility law of efficiency Conditions of exchange two sided monopoly one sided monopoly or competition two sided competition Theory of value utility and cost of Production Limits of variation in exchange value Operation of the force of demand and supply upon exchange value in the daily short period long period and secular markets

Speculation Dealers in future Relations between present and future prices The stock exchange investors jobbers bulls and bears Effect of speculation in steadying prices

Joint demand and supply Alternative demand and supply Derived demand Condition in which check to the supply of one factor in joint demand may raise its price

2 *Monopoly*—Meaning kinds of monopoly kartel trust vertical combinations Classifications of monopolies Causes of industrial combinations Law of monopoly revenue Effects on monopoly revenue of elastic and inelastic demand and of co operation of the law of productivity Class price and use price Advantages and disadvantages of monopoly Control of monopolies

3 *International trade*—Difference from internal trade Mobility of the factors of production Law of comparative cost Advantages and disadvantages of International trade International value limits of variation fixed by the difference in comparative costs Favourable and adverse balance of trade Equation of indebtedness meaning factors affecting it India's balance of trade important items of foreign trade important countries of export and import

4 *Free trade and protection*—Meaning of each Arguments for and against Meanings of encouraging Indian industries Conditions in which protection may be desirable in India Fair trades Countervailing duties Reciprocity Retaliation Imperial preference

5 *Money* Definitions characteristics, functions, special suitability of the precious metals, legal tender, full and limited Free coinage Standards of money, the quantity theory of money Other factors affecting the level of prices Appreciation and depreciation Inflation and deflation, their effects Index numbers Objects, construction, weighing defects Gresham's law and its limitations Bi metallism meaning operation in limited and wide areas Law of compensatory action Paper money convertible and inconvertible, covered and fiduciary Indian Paper currency

6 *Credit* - Postponement of payment and risk Bills of exchange in retail and wholesale trade Discounting and endorsing a bill Credit and capital Effect of credit on production

Banking -- Functions Discounts Book credit Bank's balance sheet Money market The Clearing House System purpose, working, advantages

7 *Systems of Banking* The United kingdom the Bank of England Banking and currency theories The Bank Charter Act of 1844 (as amended in 1928) India The Imperial Bank, the joint stock banks, the exchange banks, the Government Treasury system, indigenous banking, co operative banks savings banks Defects in Indian credit organization Central Reserve Bank

8 *Foreign exchange* - Meaning Foreign bills of exchange, drawer, acceptor, currency in which payable Their supply and demand, consequent effect on the exchange rate Specie points Factors affecting the demand and supply of bills trade, stock exchange and banking Par of Exchange mint par Correctives to the exchange rate

9 *The Indian Currency* - Short history up to 1893 Measures taken in 1893 and 1899 The Gold Exchange Standard Machinery of maintaining the rate Effects of a rise or fall in the price of silver Measures taken in 1919 and 1927 Effects temporary and permanent of a rise and fall of the rate of exchange upon trade and production Summary of the measures recommended by the Currency Commission of 1926 (brief outline of proposals regarding the rate the gold bullion standard and the Central Reserve bank)

10 *Consumption* -- Distinction from destruction, saving and hoarding Kinds of human wants their limitations and variety Law of consumption,

classifications of consumption into necessities comforts and luxuries and of necessities into bare efficiency and conventional necessities Efficiency as the basis of classification Variation of classification according to time, place individual and the unit of consumption

11 *Measurement of Wants*—Law of diminishing utility or satiable wants Factors modifying the operation of the law Marginal and total utility Law of equimarginal utility Law of demand Elasticity of demand Factors affecting the elasticity of demand Consumers surplus definition measurement Engle's law of consumption Methods of spending and prices in relation to satisfaction Relation of spending and savings Reaction of consumption on production Economic waste

12 *Public Finance*—Difference between public and private expenditure Public expenditure and functions of Government Theory of maximum social advantage Brief summary of sources of State income and of public debt

13 *Taxation*—Definition and characteristic of a tax The tax system Canons of taxation Direct and indirect taxation Incidence of taxation Taxes and Monopolies Shifting of a tax

14 *Indian Finance*—Peculiarities of Indian Finance Home charges, capital expenditure exchange operations agricultural seasons Brief summary of expenditure and public debt Main source of Imperial and Provincial revenue Outline of the present system of land revenue income tax customs salt and railway revenue

15 Causes of variation in national wealth and progress Books recommended—

THOMAS Elements of Economics

P BASU Principles of Economics

N L BHATNAGAR Elements of Economics

F BENHAM Economics (Pitman)

The Indian Year Book

R N MATHUR Money exchange and Banking in India

S S SEXENA and I N MATHUR Reading in Indian Economics

Vols I and II (Gautam Bros & Co)

HISTORY

There will be two papers

Paper I — General History of Modern Europe from 1648 to 1914

ACTON Lectures on Modern History

HAYES A Social and Cultural History of Europe, Vol I

HAZEN Modern European History

European History Atlas (Denoyer Grappert Co, Chicago)

FERDINAND SCHEVILL A History of Europe (George Bell)

Note -- Questions on English History should not be compulsory

Paper II -- A period of Indian History -

Either

(a) Ancient India up to 1200 A D

V A SMITH Early History of India (edited by Edwardes)

R C MAJUMDAR Ancient Indian History and Civilization

Greater India Society's Bulletins on India and China, India and Central Asia, and Java and Sumatra (Part I)

R D BANERJI Pre Historic, Ancient and Hindu India

Or

(b) Mediæval India 1000—1707 A D

FOSTER Early Travels in India

ISHWARI PRASAD Muslim Rule in India (Book II only)

ISHWARI PRASAD History of Mediæval India

ATYANGAR South India and her Mohammedan Invaders

J N SARKAR Mughal Administration

EDWARDES AND GARRETT Mughal Rule in India (Part II only)

DUTTA AND SARKAR A Text book of Modern Indian, History, Vol

I Parts 1 to 3

Or

(c) Rise and Establishment of British Dominion in India 1740—1919
(including Administration)

LYALL Rise and Expansion of British Dominion in India

RAMSAY MUIR Making of British India

SINDHIA Rulers of India Series

RANJIT SINGH Rulers of India Series

DODWELL Indian History after 1857 A D

Simon Commission Report Vol I

DUTT AND SARKAR Text book of Modern Indian History (relevant parts)

POLITICAL SCIENCE

There will be *two* papers

Paper I — Political Theory

Nature and scope of Political Science

Theories of the origin and nature of the State

The classification of States

Functions of the State

Political conception—Liberty Equality Rights Citizenship
Public opinion Sovereignty Nationality Imperialism and
Internationalism

Modern Political Theories—Utilitarianism Idealism Idealism
Individualism Collectivism Guild Socialism Syndicalism
Anarchism Communism Pluralism Fascism

Development of the State

Forms of Government

The structure of the State

Books recommended—

JOAD Modern Political Theory

ASIRVATHAM Political Theory

J P SUDA Elements of Political Science

COLE Guide to Modern Politics

GARNER Political Science and Government

Paper II — *Either*

(a) Constitutions—

(i) Detailed study of the Indian Constitution and

(ii) Outline study of the Constitutions of England U S A
France Switzerland and Soviet Russia

Books recommended—

MUNRO Government of Europe

RAM and SHARMA Modern Governments

G N JOSHI New Constitution of India

K T SHAH Provincial Autonomy (Revised edn)

K T SHAH Federal Structure

Or

- (b) A study of the Constitutions of Great Britain, India and the Dominions, including a study of the Constitutional Organisation of the British Empire

Books recommended —

SYDNEY LOW Governance of England

RAMSAY MUIR How Britain is governed

The Government of India Act of 1935

ZIMMERN The Third British Empire

KEITH Governments of the British Empire

K T SHAH Federal Structure

K T SHAH Provincial Autonomy

SHARMA and VARMA Government of India

GEOGRAPHY

There will be two papers—

Paper I —

(a) *Physical Basis of Geography*

A broad knowledge of the Physical geography of the world, including knowledge of elementary geology, sufficient for the correct appreciation of geographical phenomena

The earth as a planet its movements and relation to the sun the consequent distribution and seasonal variation of the insolation over the Earth's surface

The atmosphere distribution and periodic variation of the pressure and temperature of the air, of air movements and wind systems of humidity and precipitation, climatic types and regions

The oceans the form of sea and ocean beds temperature and salinity of oceans and seas, waves and tidal movements and their effects origin and effects of ocean circulation

The lithosphere general classification of the materials of the earth's crust, sedimentary, igneous and metamorphic rocks, earth movements and vulcanism, processes of denudation and deposition, the normal cycle of erosion and its principal interruptions, development of river systems, chief effects of glaciation, principal types of landscape

(b) Human Geography

Contents and aims of human geography the scope and interpretation of racial social economic and political aspects of human Geography its place among social sciences

Man and his environment

Growth of Population

Human establishments

Man's relation to Vegetation animals and minerals

Sources of Power—Coal Petroleum and Water

Chief means of Transportation

Life & Principal Geographical Regions

(c) Practical Work

Representation and interpretation by maps and diagrams of principal Land forms and their development Candidates will be expected to be familiar with Survey maps of India

Elementary surveying including the use of the prismatic compass plane table and chain

Principles of the following map projections their defects and suitability for particular purposes —

Conical with one or two standard parallels Bonne International Sinusoidal Mollwerde Mercator Zenithal equidistant and Zenithal equiareal

Construction and interpretation of weather and climatic maps The cartographic and diagrammatic representation of geographical data

Note — There will be no practical examination but questions referring to practical work will be included in the theory paper

Books recommended —

(a) SALISBURY Physiography

DUBEY Physical basis of Geography

CILGORY Geography Structural Physical and Comparative

GREGORY The Making of the Earth

MURRAY The Oceans

TARR and MARTIN College Physiography

- (b) VIDAL DELA BLANCHE Principles of Human Geography
 HUNTINGTON and CUSHING Principles of Human Geography
 (c) JAMESON and ORMSBY Mathematical Geography Part I
 BYGOTT An Introduction to Map Work and Practical Geography

One inch, half inch and quarter inch Topographical Maps of the Survey of India

Indian Daily Weather Report

Paper II —

- A Geography of Europe or Asia
 B India in detail

Books recommended—

BLANCHARD and VISHNER Economic Geography of Europe
 LYDE Europe
 SHACKLETON Europe
 LYDE Asia
 STAMP Asia

BERGSMARK Economic Geography of Asia
 Indian Year Book

DRAWING AND PAINTING

There will be *three* papers

Paper I — *Object and figure Drawing* —

(a) Drawing human head and also full figure from a cast (in Black and White)

Or

(b) Painting a group of still life objects (such as flowers fruits, vegetables, utensils and objects of decoration and beauty) in black and white pastels oil or water colours

Paper II — *Design and Nature Study* —

(a) Either a design or pattern on a graph paper prepared for a specified purpose, or a pictorial composition illustrating one of the historical mythological and lyrical subjects, bringing in at least two figures (including human animal or bird) prepared in outline drawing, black and white colour wash or tempera

Or

(b) A simple landscape (in black and white pastel or water colour) with an elementary knowledge of parallel and angular perspective

Paper III — *Traditional Art and Art Appreciation* —

(a) Copy from old masters viz Ajanta Bagh Moghal Rajput and modern schools

Or

(b) Appreciation of Art with regard to elementary knowledge of the canons conventions, styles differentiation and historical development of different schools of Indian painting

Note—(a) Questions will be set on all the alternatives of the three papers

(b) Students will be given the choice of answering questions in paper III (b) in Hindi Urdu or English

Books recommended —

PERCY BROWN Indian Painting
A N TAGORE Indian Artistic Anatomy
M K VERMA Geometrical Drawing
A K HALDAR Art and Tradition
KANHAIYA LAL VAKIL Ajanta
E B HAVELL Hand book of Indian Art

SOCIOLOGY

There will be two papers —

Paper I — *Principles of Sociology*

Nature and scope Definition Divisions Methods of study Relation with biology history psychology anthropology ethnology economics ethics and politics

Theory of evolution in relation to man.

Growth of society zoogenic ethnogenic, and demogenic associations
A brief survey of civilizations

Factors in the growth of social organisations (a) Geographical climate and natural resources as determining fundamental occupations

(b) biological nutrition and reproduction, heredity and environment ,
 (c) psychological , (d) aesthetic , (e) ethical , (f) religious and
 (g) historical

Types of social organisation (a) Family matriarchal and patriarchal , (b) horde, clan, tribe, caste, race, nation , (c) political city state, country state, empire federation, nationalism, (d) economic, slavery, feudalism, industrialism, communism , (e) religious monastic orders , (f) social clubs associations , (g) educational school, college, university

Social pathology , (a) poverty and the problem of charity , (b) diseases and sanitation, sterility and sterilisation, (c) crime prisons and Borstals, (d) over population and birth control , (e) abuse of nationalism and wars , (f) colour or racial problems social laws and social justice

Instincts their nature and sociological importance

Role of concepts of suggestion imitation, sympathy and intellect in social life

Psychology of the moral, the economic and the religious life

Definition of Crowd Causes of its formation Crowd behaviour its intellectual and emotional characteristics Crowd as distinguished from organised group

Books recommended for study—

GIDDINGS Principles of Sociology

BLACKMAR and GILLIN Outlines of Sociology

ROSS Outlines of sociology

BUSHEE Principles of Sociology

ELLWOOD Social Psychology

MUKARJEE and SEN GUPTA Social Psychology

Books for reference

HADDON Races of Man

KLANE Man Past and Present

HUTCHINSON Living Races of Mankind

HAYES Sociology New York

GINSBERG Psychology of Society

MCDONCALL Group Mind

RIVERS Social Organisation

TAYLOR Anthropology

Paper II —Indian Social Institutions

General characteristics of Hindu social organisation Caste its different aspects economic racial ethical religious social different theories of caste critical survey of its effects on history of India distinction between caste and class its influence on non Hindus in India influence of British administration and law on caste

Hindu joint family its original advantages its present effects distinction between family joint family and coparcenary its legal implications right to partition legal position of woman in joint family

Hindu marriage its varieties *anuloma* and *pratiloma* general problem of inter caste marriage and its history significance of *gotra* endogamy and exogamy legal and social implications of *Stridhan* infant marriage its effects its present position prohibition of widow marriage its legal and social effects problem of divorce marriage customs polygamy relation of Hindu social institutions and Hindu religion question of introducing reforms by legislation

Muslim family marriage as contract divorce legal status of woman purdah its original significance its vogue in India and other Islamic countries its effects

Indian village organisation importance of village in Indian society the ancient village its organisation the village *sabha* its relation to central government effect of British administration on the village organisation villages in present India their condition now their economic life revival of village *panchayats* how far successful village problems of the present day

Races in India older views their criticism re classification Racial history of India Cultural stages in India Primitive life in modern India

Book recommended for study

Census of India report (relevant portions)

Imperial Gazetteer of India Vol I Chapter VI

RISLEY Peoples of India

O MALLAY India's Social Heritage

BLUNT The Caste System of Northern India

Books for reference

DUDLEY STAMP Asir

NANAVATI Indian Rural Problem

P K WATTAL Population Problem in India

W C Smith Modern Islam in India

GHURYE Race and Caste in India

INDIAN MUSIC

A — Vocal

(i) Evolution of Scale (ii) Jati (iii) Definition and Lakshana of Raga
 (iv) Thata and classification of Ragas under the Thatas (v) Asraya raga ,
 Purva raga , Uttara raga Sandhi Prakasha raga , Guna dosa of the
 musicians Suddha, Chayalaga and Sankirna ragas Graha Ansa and
 Vyasa , svaras , Sruti and Svra Sthanas , Gita , Gendharva and Gana
 Ragalapa Bahutava and Alpatva , Rupakatapa Alapti Avirobhava
 and Tirobhava , Sthaya , modern Alapa Gayana , Tana Doltana Vag-
 geyakara Prabhandha , Dhruvapada Khyala Tappa , Thumari,
 Dhamara , Hori Tarrana Chaturanga Trivata History of Indian
 Music Distinction between Indian and European scale Distinction between
 Melody and Harmony Difference between the Hindustani and Karnatic
 systems of Tala

Practical

One Bara Khyal , One Chota Khyal or Tarrana or Chaturanga or
 Bhajan in the following ragas —

Kalingada , Sri raga Sohani Suddha Kalyana Kamoda Chayanata,
 Hindol , Ramkali Paraja , Purva Lalita Gauda Malhara Miyan
 Malhara Adanal Bhairava Bahar

In addition to the above ragas, a knowledge of the following ragas as
 prescribed for the High School and Intermediate examinations will also
 be required —

Bilavala , Khamamaja Yamana , Bafi Asavari Bhairavi, Behaga
 Desa , Bhimpalasi Bhupali, Vrindavani sarang , Bhairava Vagisvari
 Hamira Pilu , Kedara Tilak Kamoda Puravi Marava Todi Mala
 kosa Durga Kanada Javjayavanti Bahara Multani Vasanta
 Gauda Saranga Sankara Desakara Puriya Dhanasri Jaunpuri

The candidates will also be required to learn at least 5 Dhruvapada and
 5 Dhamars in different ragas out of the above syllabus

Tala — The candidate must possess a knowledge of the following Talas —

Tritala Panjabi Teeka Tilwadi Didiara Jhaptala Jhumara
Ada Chautala Chautala Ekatala Sulpbala Dhamara Tivra
Rupaka Dipachandi (Chanchar) and Kaharva

B — Instrumental

The following in addition to be the syllabus prescribed for Theory in Vocal Music —

Cata Jhala Ghssita Joda Parana Zamzama
Evolution of Sitar and Tabla

Practical

One of the following instruments is prescribed for the practical test —
Vina Sarangi Saraja Sitar Violin Sirod Pakbaya Tabala

The candidates must possess a general knowledge of the Ragas prescribed for vocal music but special attention must be paid to the Ragas mentioned below He must know Saragams alapas (Joda) gat Todas etc in these raga

Bhumapalasi Bhupali Bhuvaya Bhairavi Kafi Behaga Desai
Tilaka Kamoda Vagisvari Asavari Pilu Kandsa Todi Yamana
Puriya Malhosa

In Pakhavaja or Tabla candidates must possess a practical knowledge of the Thekas Mukhada and at least a dozen Paranas Relas etc and their Tihais in all the talas given above

The candidate must know the system of tuning the instrument he/ she offers and must be able to effect simple repairs

Books Recommended

- 1 V N BHATI HANDE Hindustani Sangit Kramika Series Parts I—IV
Published by V S Sukathankar Solicitor Malabar Hills
Bombay 2
- 2 RAJA NAWAB ALI Selections from Muraful naghmat Bhatkhande
University Lucknow)
- 3 KRISHNADHAN BANERJI Cita Sutra Sura
- 4 GOPESHWAR BANERJI Sangit Chandrika

- 5 V N PATWARDHAN Raga vijnana (Gandharva Maha Vidyalaya,
Poonā)
 - 6 HAMID-HUSSAIN Talim Sitar (Marris College of Music, Lucknow)
 - 7 S P BANLRIJI Sitaramarga (Marris College, of Music, Lucknow)
 - 8 Shastra Pravasha Parts II IV
 - 9 V N BHATKHANDE A short Historical Survey of the Music of Upper
India (University, Lucknow)
 - 10 S N RATANJANKER Tan Sangraha Parts I and II (Marris College of
Music Lucknow)
 - 11 MRS ATIYA BEGUM Sangit of India (Villa Atiya, Ridge wood,
Bombay)
 - 12 G S RANADE Hindustani Music its Physics and Aesthetics (Willingdon
College Bombay)
 - 13 RAJA BHAIYA POCCHWALE Tana Mbbha Parts I II and IV (Madhava
Sangita Vidyalaya, Gwalior)
 - 14 SAKHARAM Tabla Siksa
 - 15 GOBIND RAO GURU Mridang Tabla Vadana Subodha Part I and II
(Burhanpur, C P)
-

M A EXAMINATION

ENGLISH LITERATURE PREVIOUS

There will be four papers

Paper I —English Poetry from 1798 to the present day

Prescribed Texts (a) For Detailed study—

WORDSWORTH Selected Poems; edited by Matthew Arnold
(Macmillan's Golden Treasury Series)

KEATS Odes

SHELLEY Adonais

BYRON Child Harold Canto III

TENNYSON In Memoriam

The Golden Treasury of Modern Lyrics Book II (edited by
Binyon)

(b) For General study—

BROWNING Selections by Young

MORRIS The Defence of Guenevere and other Poems,
including the Life and Death of Jason (World's
Classics Edition)

D G ROSETTI The blessed Damozel

Paper II —The Drama, with special reference to Shakespeare

Prescribed Texts (a) For detailed study—

SHAKESPEARE As You Like It Richard II The Tempest King
Lear

BEN JONSON Every Man in His Humour

SHERIDAN The School for Scandal

Note —Candidates will be expected to show first hand acquaintance with
all the principal plays of Shakespeare

(b) For general study—

MARLOWE Edward II

MILTON Samson Agonistes

BERNARD SHAW Candida

GALSWORTHY Strife

Paper III —English Poetry from 1580 to 1800

(a) Prescribed Texts—

MILTON Paradise Lost Books I and II

POPE The Essays on Criticism

N. SMITH The Oxford Book of Eighteenth Century Verse (Poems of Thomson, Collins, Gray and Cowper)

(b) *For general study—*

W. T. YOUNG An Anthology of the Poetry of the Age of Shakespeare (Cambridge University Press)

Paper IV—English Prose from 1580 to 1800

Prescribed Text for Detailed Study—

SIRNEY Apologie or Poetrie

BACON Essays I to V The following Essay—

Of Study Of Discipline Of Ceremonies and Respects,
Of Followers and Friends Of Suits, Of Expense, Of
Pigment, Of Health, Of Honour and Reputation Of Faction,
Of Negotiating

BROWNE Heretichia Chapters IV & V

MILTON Areopagitica

ADDISO Essays (edited by Fowler, English Literature Series
Macmillan)

JOHNSON The Preface to Shakespeare annotated by J. K.
Macphail (Oxford University Press)

Books recommended for general reading—

Paper I

WAPD English Poets Vols IV and V

SAINTSBURY Nineteenth Century Literature (Macmillan)

HUGH WALKER The Literature of the Victorian Era [Cambridge
University Press]

Paper II

A. NICOLL Theory of Drama [Harvard]

A. W. WARD English Dramatic Literature

BRADLEY Shakespearean Tragedy

RALEIGH Shakespeare [E. M. L.]

HERFORD Outlines of Recent Shakespearean Investigation

RALLI A History of Shakespearean Criticism

SCHFFLING The English Drama [Channels of Literature
Series]

Paper III

O. ELIO The Augustan Ages [Blackwood]

H. J. C. GRIERSON The First Half of the Seventeenth Century
[Blackwood]

C. E. VAUGHAN The Romantic Revolt

PHELPS Beginnings of the Romantic Movement

WARD English Poets Vols II and III

Paper IV

CRAIK English Prose Selections Vol IV

GOSSE Eighteenth Century Literature

A H BUILEN The Elizabethans [Chapman and Hall]

RALEIGH Six Essays on Johnson

FINAL

There will be four papers and a viva voce test

Paper I—History of English Literature from 1350 to 1914 including questions on the History and Principles of Criticism Candidates will be expected to show first hand knowledge of the principal works of representative authors

Paper II—Early Poetry from Chaucer to Spenser including an elementary study of Middle English Grammar

Prescribed Texts a) For detailed study—

CHAUCER Prologue to the Canterbury Tales and the Nonne Priestes Tale

LANGLAND Prologue to Piers Plowman

SPENSER The Faerie Queene Book I

(b) For general study—

SKEAT Specimens of the English Literature from 1394—1579

Paper III—English Prose from 1800 to the present day

Prescribed Texts (a) For detailed study

MATTHEW ARNOLD Essay on Criticism Second Series omitting the essay on Ansel

English Critical Essays XX Century [The World's Classics] [O U P] The Essays by Robert Bridges George Saintsbury Alice Meynell A C Bradley Sir L K Chambers J A Chapman Lascelles Abercrombie and Middleton Murry

HAZLITT Selection from Kings Treasures Series (Macmillan)

(b) For general study—

The Novel with special reference to—

SCOTT Old Mortality

THACKERAY Vanity Fair

MEREDITH The Ordeal of Richard Feverel

HARDY Tess of the D'Urbervilles

JOSEPH CONRAD Lord Jim

Paper IV —An Essay on a literary subject

Books recommended for general reading—

Paper I

The Cambridge History of English Literature

Channels of English Literature Series

Handbooks of English Literature [The Age Series]

SAINTSBURY History of English Criticism

SAINTSBURY Loci Critici

A C WARD Twentieth Century Literature

LEGOUIS and CAZAMIAN History of English Literature

SCOTT JAMES Making of Literature [Benn]

WORSFOLD The Principles of Criticism, [George Allen & Unwin, Ltd, London]

SHIPLEY The Quest of Literature [Published by Richard R Smith, New York]

Vaughan English Literary Criticism [Blackie and Sons]

Paper II

E LEGOUIS Chaucer [Dent]

W P KER Mediæval English Literature

CHURCH Spenser [Macmillan]

Paper III

RALEIGH History of the English Novel

E A BAKER The History of the English Novel

SAINTSBURY The English Novel [Dent]

HUGH WALKER The English Essay and Essayists [Dent]

O ELTON Survey of English Literature, 1830—1880 Vols I and II

ARABIC

Note—Arabic words must be written in Arabic character

There shall be eight papers, four for the Previous and four for the Final. Paper VII (Translation) must be offered in the Previous, and Paper VIII (Essay) in the Final. Out of the other six a candidate may select any three for the Previous and the other three for the Final.

Paper I - Classical Prose

(١) مقامات حویری ten maqamat

(١١) انوار المصنف

Paper II Classical Poetry

۱) لسانی and باب العماد دونوں

(ii) الغالب السبع

Paper III Literary Criticism

۱) ابن مندہ by کتاب ادعاب

(ii) العکری

Paper IV History of Arabi Literature Haurt or Nicholson

Paper V and VI Any two of the following

(a) Mysticism—Selections from احادیث العماد and رسالہ مسرورہ

(b) Commentary on the Quran—Selections from رسالہ or
اصاوی or جمع لغزاع طبری

(c) Text Hadith with the Allied Lugbat either معجم مسام
with the help of المعجم or معجم السام with the help of المعجم

(d) Logic and Metaphysics

نامی منارک صدر احمد (۱)

(e) Comparative Philology of Semitic Languages
O' Leary's Comparative Grammar of Semitic Languages

(۲) مسرورہ حضرت شافعی رحمہ اللہ

(f) History of Islam (one specific period from
(۱) ابن اکرمی or طبری)

Paper VII—Translation from English into Arabic and vice versa

Paper VIII—Essay on a literary subject

*Note—Critical questions shall be set in Papers I and II A sound know-
ledge of Syntax Prosody and Rhetoric shall be expected*

PERSIAN

Note—Persian words must be written in Persian character

There shall be *eight* papers, four for the Previous and four for the Final Paper VIII (Essay) must be offered in the Final Out of the other *seven*, a candidate may offer any *four* in the Previous and the other *three* in the Final

Paper I — Classical Prose

(1) نشر دوم — عروسی (1)

(2) شدم شاداب — تشری (2)

Paper II- Classical Poetry

(1) انتخاب کلیات حافظی Published by Anwar ul-Matabe Lucknow, omitting following Qasidas:—

(۱) هو صبح بای صبر دایم در اورم

(۲) ای نیم بونہ گوشتہ در دار ملک لا

(۳) صبح دارم کو کائناتے در دہن اور دہلم

(2) قصائد عروسی

The following Qasidas are prescribed --

(۱) ای نرندہ دایم نلا را

(۲) سبیدہ دم چو ردم آتشی نہ شمع شعور

(۳) صاعدہ چوں در دہد دل شور شون رائے می

(۴) دمیکہ لشکر عم می کشد بگو بخواوی

(۵) چہ چہ پزدار حہاں رحب کشد چوں بعمل

(۶) راسماں و رہیں مژدہ ناگہاں آمد

(۷) صلاح عید کہ در نگاہ نار و رعیم

(۸) آس نار کاہ گیسٹ کہ گویندے ہراس

(۹) ہر سوختہ حالے کہ نکشہو در آند

(۱۰) بوبہار آمد کہ اشاد بکس یار کل

(۵) انتخاب دیوان حکیم فرخی Published by Qaumi Kutab Khana Lahore, the following Qasidas are prescribed --

(۱) برآمد بیلگور ابرے روزے ناگہاں دریا

(۲) ہمی تا حشر ہری حدارد حہاں باشد

- (۳) دنی درخت ساه زمانہ نادل ساد
 (۴) قومی نکلندہ دنی محمد مختار
 (۵) مسالہ کسب و کھس سہ حدود (اسکندر) —
 (۶) لہ ز جنگ آمدہ و روئے نمونہ دستکار —
 (۷) سال و ماہ نیک و دور خرم و طرح بہار —
 (۸) سہر عزیزی بہ مناسب نہ من دہم نادر —
 (۹) دنی حرمی جہاں دنی تارکی بہار —

Paper III —Sufistic Poetry

(1) مسدوی مولانا حلال الدین رومی (Selections published by Anwar ul Matabe, Lucknow)

ردیف ”د“ — سدواں حافظ (۲)

(3) اسرار حودی by Allama Iqbal

(4) می نگارم beginning with ربہ الدین عطار (Shah & Co Hakim Wasi Road Agra)

Paper IV —Biographies

Biographical and critical study of Amir Khusraw

Books recommended—

- 1 Pre Mughal Persiao in Hindustan by Prof Shams ul Ulama M A Ghani M A M LIT [Cantab]
- 2 Hazrat Amir Khusraw by Prof Habib
- 3 Sherul Ajam by Moalana Shibli Parts II IV and V
- 4 Nigaristan : Fars by Azad
- 5 Encyclopaedia of Islam Article on Amir Khusraw
- 6 Persian Portraits by Sir Gore Ouseley
- 7 Khusraw by Dr Wahid Mirza

Paper V —History of Persiao Literature

Section I Pre Ghaznavid from ninth century A D Ghaznavid Seljuq Mongol and early Timurid periods

Or

Section II Later Timurid Safavid Mughal and Qachar periods

Books suggested—

E G BROWNE History of Persian Literature four volumes

JOSEPH CONRAD Lord Jim

Paper IV — An Essay on a literary subject

Books recommended for general reading—

Paper I

The Cambridge History of English Literature

Channels of English Literature Series

Handbooks of English Literature [The Age Series]

SAINTSBURY History of English Criticism

SAINTSBURY *Loci Critici*

A C WARD Twentieth Century Literature

LEGOUIS and CAZAMIAN History of English Literature

SCOTT JAMES Making of Literature [Benn]

WORSFOLD The Principles of Criticism, [George Allen & Unwin, Ltd, London]

SHIPLEY The Quest of Literature [Published by Richard R Smith, New York]

Vaughan English Literary Criticism [Blackie and Sons]

Paper II

E LEGOUIS Chaucer [Dent]

W P KER Medieval English Literature

CHURCH Spenser [Macmillan]

Paper III

RALLIGH History of the English Novel

E A BAKER The History of the English Novel

SAINTSBURY The English Novel [Dent]

HUGH WALKER The English Essay and Essayists [Dent]

O ELTON Survey of English Literature, 1830—1880 Vols I and II

ARABIC

Note — Arabic words must be written in Arabic character

There shall be eight papers, four for the Previous and four for the Final. Paper VII (Translation) must be offered in the Previous, and Paper VIII (Essay) in the Final. Out of the other six a candidate may select any three for the Previous and the other three for the Final.

Paper I Classical Prose

(۱) مقامات حویری *ten maqamat*

(۲) آوارا المنعده

Paper II— Classical Poetry

۱) لسانی and باب الحماة دیوان ۱)

۱۱) الغلات السعة

Paper III Literary Criticism

این متنه by کتاب المعارف ۱)

۱۱) العودی

Paper IV History of Arabi Literature Haurt or Nicholson

Paper V and VI Any two of the following

(a) Mysticism—Selections from رساله سرو and احادیث معلوم

(b) Commentary on the Quran -Selections from وساب or
مصابی or جمع لغوات طبری

(c) Text Hadith with the Allied Lughat either مجمع مصاب
with the help of مجمع المعارف or مدار with the help of مجمع المعارف

(d) Logic and Metaphysics

دعای مبارک صدر احمدی

(e) Comparative Philology of Semitic Languages
O' Leary's Comparative Grammar of Semitic Languages

۲) منسور حضرت ساعی نوح حکیم مصاب

(f) History of Islam (one specific period from
(النس اکبری or طبری)

Paper VII—Translation from English into Arabic and vice versa

Paper VIII—E say on a literary subject

*Note—Critical questions shall be set in Papers I and II A sound know-
ledge of Syntax Prosody and Rhetoric shall be expected*

PERSIAN

Note—Persian words must be written in Persian character

There shall be *eight* papers, four for the Previous and four for the Final Paper VIII (Essay) must be offered in the Final Out of the other *seven*, a candidate may offer any *four* in the Previous and the other *three* in the Final

Paper I — Classical Prose

نشر دوم — ہجری (1)

ششم شاداب — تفرشی (2)

Paper II Classical Poetry

(1) Published by Anwar ul-Mataba Luoknow, omitting following Qasidas:—

(1) ہوسلج پالے صنو بدامی در اورم

(2) اے پنم بونہ کوٹہ در دار ملک لا

(3) صلح وارم کو کلائے دو دہس لوردہلم

تصاد عرفی (2)

The following Qasidas are prescribed --

(1) اے لردہ دامی لا را

(2) سیدہ دم چو ردم استیں نہ شمع شعور

(3) صلحدم چوں در دمہ دل شور شتوں رالے می

(4) دمیکہ لشکرعم می کشد نعو وحواری

(5) چہہ پزدار حہاں رحب کشد چوں بحمل

(6) راسماں و رہیں مژدہ ناگہاں آمد

(7) صلح عید کہ در نیکہ گاہ نار و نعیم

(8) آس نارگاہ کیست کہ گوید لے ہراس

(9) ہر سوختہ حالے کہ نکشو در آد

(10) بوبہار آمد کہ اشاند نعتس یار گل

(3) Published by Qaumi Kutab Khana Lahore, the following Qasidas are prescribed --

(1) برآمد بیلگور ابرے روئے بیلگون دریا --

(2) ہمی تا حسرو ماری خداوند حہاں باشد

- (۳) یعنی دولت ساد زمانہ نادر ساد -
 (۴) مری گندہ دبی معدودہ مختار
 (۵) مسانہ گیس و کہیں سد حدیث اسکندر—
 (۶) لے ر جنگ آمدہ و روئے نمودہ نیکار—
 (۷) سال و ماہ و یک و روز حرم و طرح بہار—
 (۸) شہر عربی و مناسب و مں دندم نادر—
 (۹) دندم حرمی جہاں دندم نازکی بہار—

Paper III —Sufistic Poetry

(1) مسنوی مولانا خلیل الدین رومی (Selections published by Anwar ul Matabe, Lucknow)

ردیف "د" سدہواں حاط

(3) اسرار حرمی by Allama Iqbal

(4) beginning with دگر مں Shab & Co
Hakim Wasi Road Agra)

Paper IV —Biographies

Biographical and critical study of Amir Khusraw

Books recommended—

- 1 Pre Mughal Persian in Hindustan by Prof Shams ul Ulama
M A Ghani M A M LITT [Cantab]
- 2 Hazrat Amir Khusraw by Prof Habib
- 3 Sherul Ajam by Moalana Shibli Parts II IV and V
- 4 Nigaristan : Fars by Azad
- 5 Encyclopaedia of Islam Article on Amir Khusraw
- 6 Persian Portraits by Sir Gore Ouseley
- 7 Khusraw by Dr Wahid Mirza

Paper V —History of Persian Literature

Section I Pre Ghaznavid from ninth century A D Ghaznavid Seljuq
Mongol and early Timurid periods

Or

Section II Later Timurid Safavid Mughal and Qachar periods

Books suggested—

E G BROWNE History of Persian Literature four volumes

M A GHANI¹ History of Persian Language at the Mughal Court, three volumes

MOHD ISHAQUF Modern Persian Poetry

Note — The question paper to contain questions on both the sections

Paper VI — Modern Prose and Poetry

(1) Haji Baba Isphahani, edited by Shadru Bilgrami and published by Sh Mubarak Ali, Bookseller, Inside Lahori Gate, Lahore — ار گفتار اول تا ستم گفتار دهم

(2) مود حسس published by Sh Mubarak Ali, Lahore

(3) "ردیف الف و ب" (نکات کلیات فانی) (published by Sh Mubarak Ali, Lahore)

(4) ادبیات ابرو نو (Qoumi Kutab Khana, Lahore)

Paper VII One of the following subjects selected by the head of the department in the beginning of the session

(a) Mysticism

۱۔ کیہ یائے سعادت عزالی۔ (۱) عنوان اول دوشنا حتی درستی

(۲) عنوان دوم درسنا حتی حق سبحانہ تعالیٰ

(۳) عنوان سوم در معرفت دنیا

(۴) عنوان چہارم در معرفت آخرت

۲۔ معانی الانس حاص —

ار تمہد فی القول فی اولاتہ والولیٰ منشروع ذکر ابو حاشم الصرمی الکلام فی تفصیل
الریاء from کشف المعجوز (3) to the end of (3) انراہیم فی الکلام در سگوب

(b) Politics and Civics

(1) مدرہ منزل۔ اخلاق ناصری

(۲) سیاست مدرہ مذاق حالی

(c) Historical Literature

[1] Farikh i labari, Vol IV, from the beginning to the end of Prophethood

[2] Rauzatus Safa Vol II by Khawand Mir Harvi [Newal Kishore Pre s Edn] from the beginning of the Caliphate [page 219 to the end page 322]

(d) Literary Criticism

SHIBLI Sherul Ajam Vols I II III IV and V

Paper VIII — Essay on a literary subject

Note—Critical questions will be set in Papers I II III and IV A sound knowledge of Syntax Prosody and Rhetoric shall be expected

SANSKRIT

There will be eight papers as follows —

I Vedic Literature and Elements of Comparative Philology

II Classical Literature

III Indian Philology

IV Literary and Cultural History of Ancient India
Either Group A — Sanskrit Language and Literature

V Rhetorics and Prosody

VI Drama and Dramaturgy

VII Kavya and Grammar
Or Group B — Philosophy
Nyaya and Vaisheshika

VI Sankhya and Yoga

VII Vedanta and Mimamsa

VIII Sanskrit Composition and Translation from English into Sanskrit
Paper VIII shall be offered in the Final year only. Candidates can offer any other four paper in the Previous and the remaining three papers in the Final Examination subject to the following restrictions

[1] Candidates offering one or more papers of Group A in the Previous shall have to offer Paper II as one of the four papers for the Previous Examination

[2] Candidates offering one or more papers of Group B in the Previous shall have to offer Paper III as one of the four papers for the Previous Examination

Paper I — Vedic Literature and Elements of Comparative Philology

(a) Vedic Literature

PETERSON Hymns from the Rigveda [Bombay Sanskrit Series No XXVI] Hymns Nos 2 8 10 12 14 19 20 23 24 26 28 30

ements of Comparative Philology

outlines of scope mechanism of speech, phonetic laws and
classification of languages with special reference to the Indo Aryan
ap

commended—

AHAGIRDAR An Introduction to the Comparative Philology of
Indo Aryan Languages [Oriental Book Agency, Poona]

ANGAL DEVA SHASTRI Tulanatmaka Bhasha Shastra
—Classical Literature

AGHA Sisupalavadha, Cantos I and II

HAVABHUTI Uttara Ramacharita

ALIDAS Meghaduta

AJAYALKYA Acaradhyaya, the following—Prakaranas —

Upodghata, Brahmachari, Vivaha, Grihasthadharma, Snatak-
adharma and Rajadharma

—Indian Philosophy

Katha Upanishad with Shankarabhashya

ISAIA MISRA Tarkabha ha

ADANNA Vedantasara

commended—only relevant portions

ALDRA UPADHYAYA Bhartiya Darshan

R HIRIYANA Outlines of Indian Philosophy

—Literary and Cultural History of Ancient India

recommended—

INTERNITZ History of Indian Literature, Vol I

EITH History of Sanskrit Literature

ACDONELL India's Past

K MUKERJI Hindu civilisation only chapters IV, V, VI and
VII pages 296 319

Cam His Vol I only chapters II—X and XXVI

Questions in this paper are to be confined to the topics dealt with in
recommended

GROUP A —SANSKRIT LANGUAGE AND LITERATURE

—Rhetoric and Prosody

(a) Rhetoric—

Alankaraprakasa

recommended—

V KANL History of Alankara Literature

K DE Sanskrit Poetics, Vol II

(b) Prosody —The following meters —

आया अनुष्टुप्, इन्द्रज, उपेन्द्रज उपजाति, सुवन्दप्रयात, इन्द्रतिलमित, मरुत्त,
प्रविण्ण वसततिलरु, मालिनी, हरिणी, शिखरिणी, मन्दाक्रान्त, शादूलनिकृति,
मरुत्त ।

Paper VI —Drama and Dramaturgy

(a) Drama

Mricchakatika

Ratnavali

Venisamhara

(b) Dramaturgy —

BHAPATA Natya : tra Chapters I and II

DHARMANJAYA Dharupakam

Paper VII —Kavya and Grammar

(a) Kavya —

Vikramarkadevacarita Canto I

(Karswati Bhawan Text Series Govt Sanskrit College
Benares)

Naishadha Cantos I and II

Kadambari Purnabhaga upto the end of Mahashveta
Vrittanta

(b) Grammar —

Siddhantakaumudi—Kataka

Iaghukaumudi—Kridanta and Samasa

Or Group B —PHILOSOPHY

Paper V —Nyaya and Vaisheshika

VATSYAYANA Nyaya Sutra's with Bhashya Chapter I

VISVANATH Nyaya Sidhantamuktavali Pratyaksha & Shabda bhanda
Prasastapadabhashya

Recommended —

Tarkasangraha edited by Bodas

Paper VI —Sanhya and Yoga

VACHSpati Mishra Sankhakatattvakaumudi

BHOJA Yogasutratrivruti Chapters I II III (only 115 Sutas) and IV

Paper VII —Vedanta and Mimamsa

SANIKARA Brahmasutra with Surinabhashya Adhvaya 1 Pada 1
Sutras 11 and Adhyaya II Padas 1 and 2

Laugakshibaskara Arthasamgraha, edited by D V Gokhale [Oriental Book Agency, Poona]

Paper VIII—Sanskrit Composition and Translation from English to Sanskrit

Books recommended—

MANGAL DEVA SHASTRI Prabandha Prakasba (Indian Press, Allahabad)

GIRIDHAR SHARMA Nibandhadarsh

Published by (Sbarda Mandir, Nai Saral, Delhi)

HINDI

There shall be the following *eight* papers of which the Essay paper [Paper VIII] must be taken in the Final Examination and out of the remaining *seven* papers, any *four* may be taken in the Previous Examination and the other *three* may be taken in the Final Examination

Paper I—Modern Text (Prose and Drama)

1 Bhartendu Harishchandra Chandravali Natika

2 Jaishanker Prasad Ajat Shatru

3 Prem Chand Godan

4 Ram, Chandra Shukla Chintamani (Essays Nos 3, 5, 6, 11 to 16 only)

5 Dr S K Lal Hindi Kahaniyan (published by Sahitya Bhawan, Ltd, Prayag)

Books recommended —

1 Shiv Nath Acharya Ram Chandra Shukla (published by Saraswati Mandir, Benares)

2 S N Srivastava Hindi Upanyas

3 Dr L S Varshney Adhunik Hindi Sahitya

4 Dr S K Lal Adhunik Hindi Sahitya ka Vikas

5 Braj Ratna Das Hindi Natya Sahitya

Paper II—Modern Poetry

1 Ratnakar Udhava Shatak

2 Prasad Kamayani चिन्ता, आशा, भ्रष्टा, काम ।

3 Maithili Saran Yashodhara

4 Hari Audh Vaidelivanavas

5 Pant Adhunik kavī II [Published by Hindi Sahitya Sammelan Prayag]

Books recommended

1 Krishna Shanker Shukla Kavitar Ratnakar [published by Vidya Bashir Book Depot, Benares]

- 2 DR K N SHUKLA Adhunik Hindi Kavya Dhara [published by
Saraswati Mandir Benares]
- 3 GANGA PRASAD PANDEY Kamayani Ek Parichaya [published by
Messrs Ram Narayan Lal Allahabad]

Paper III —Media val Texts

BEHARI LAL Sanyal

TULSI DAS Vinayapatrika

SENAPATI Kavita Ratnakar [Hindi Parishad
Allahabad University]

RAM CHANDRA SHUKLA Bhramar Gita Sar

Books recommended for general study —

DHIRENDRA VERMA Ashta Chhap

RAM KUMAR VERMA Hindi Sahitya ka Alochnatmak Itihas
Part I

Paper IV —Old Texts

CHAND BARDAI Prithviraj Raso [Padmavati Samaya] Ed H N
Tandan [Published by Shri Ram Mehra & Co Agra]

SHYAM SUNDAR DAS Kabir Granthawali
Sahities only (N P Sabha Kashi)

MALIK MUHAMMAD JAYASI [Padmawat upto रत्नसेन वृत्ति खण्ड]
(N P Sabha Kashi)

Bel Rukmani Krishna Ri first 186 Padas only

Books recommended for general study —

P D Barthwal The Nurguna School of Hindi Poetry (Indian
Book Shop Benares)

Hazari Prasad Kabir (Hindi Granth Ratnakar Karyalaya
Bombay)

Paper V —Principles of Criticism and History of Literature

Shyam Sundar Das Sahityalochan [Revised
edition]

Vishwa Nath Prasad Misra Vangmaya Vimarsha (excluding the
portions on Philology)
[Hindi Sahitya Kutir Benares]

H P Dwivedi Hindi Sahitya ki Bhumika [Hindi Granth
Ratnakar Karyalaya Bombay]

Shyam Sundar Das . Hindi Bhasa aur Sahitya, [Portion on Literature only]

Ram Chandra Shukla Hindi Sahitya ka Itihas [Revised and enlarged edition]

Ram Chandra Shukla Chintamani, Part II
(Saraswati Mandir Jatanbar, Benarés)

Kanhaiya Lal Poddar Alankar Manjari

Kanhaiya Lal Poddar Ras Manjari [Latest Edn]

Paper VI —Comparative Philology and development of Hindi Language

History of the Sciences, Language and its origin , Classification of Languages , Causes of Change in Language , Phonetic changes , Semantic changes , Morphological Development of Language , History of the Indo-Aryan Language with special reference to Hindi , Development of Hindi, and Elements in the Vocabulary of Hindi

Books recommended—

Shyam Sundar Das Bhasha Vigyan (Revised edition)

Babu Ram Saxena Samanya Bhasha Vigyan (Hindi Sahitya Sammelan, Prayag)

Shyam Sundar Das Hindi Bhasha aur Sahitya (Portion on language)

Dhirendra Varma Hindi Bhasha ka Itihas
(Hindustani Academy, U P Allahabad)

Ram Krishna Shukla Arya Bhasha and Sanskriti

Paper VII —(a) A Subsidiary Modern Indian Language

Or

(b) A Basic Language ,

Or

(c) Detailed and critical study of a special author or period

(a)—Subsidiary Languages

Urdu —

Chakbast Mazamun i Chakbast

Alias Barni Musaddas i Hali

Hali Muqaddama Shair o-Shair

Ram Babu Saxena Tarikh-Adab Urdu translated by Mirza Mohammad Asqari, [Newal Kishore Press Lucknow],
Chapters I II and III pp 1 57]

Marathi —

- R Kirloskar Shakuntala
 N N Apte Usha Kai
 V Kelkar Abhinaya Kavyamala Part IV
 G G Agarkar Nibandnamala Part I

Bengali —

- Rabindra Nath Tagore Bahaka
 Bankim Chandra Chatterjee Bish Brakha
 Hara Prasad Shastri Bharat Mahila
 D L Roy Chandra Gupta

*(b)—Basic Languages*** Sanskrit.—*

- Raghuvansam, Canto VI
 V Anantacharya Chaudrapidacharitam
 Shakuntalam Act IV
 Hale Smaller Grammar of Sanskrit
 Ram Behari Lal Sanskrit Dwitiya Pustakam

- Pali —* N V Tungal Jatak Sangrah (Oriental Book Agency Poona)
 Adya Datta Thakur Paliprabodh
 C V Joshi A Manual of Pali (Oriental Book Agency Poona)

Apabhramsa —

- Hem Chandra Vyakaran [Apabhramsa portion only]
 Narottam Das Swami Apabhramsa Path Mala [Part I] [Indiav Press Allahabad]

*(c)—Detailed and critical study of a special author or period**Any one of the following authors —*

- Tulsi Keshava Sur Bharatendu Harish Chaudra and Jai Shankar Prasad

*Books recommended—**Tulsi*

- 1 Tulsi Das by Dr Mata Prasad Gupta
- 2 Tulsi Darshan by Dr B P Misra
- 3 Goswami Tulsi Das by R C Shukla

SUr

- 1 Sur Sahitya Ki Bhumika by R R Bhatnagar
- 2 Sur Das by Pt R C Shukla
- 3 Sur Saurabha by Munshi Ram Sharma

Bharatendu Harishchandra

- 1 Bharatendu Harishchandra by Brij Ratna Das
[Published by Hindustani Academy, Allahabad]
- 2 Bharatendu Yuga by Dr Ram Bilas Sharma
- 3 Bharatendu Ji Ki Bhasa aur Shaili by Gopal Lal Khanna

Jai-shan-lar Prasad

- 1 Prasad ke Natakon Ki Shastriya Adhyayan by Dr J N Prasad Sharma
- 2 Prasad Ki Kavya Sadhana by Ram Nath Lal Suman
- 3 Prasad aur unka Sahitya by Vinod Shanker Vyas, (Published by Vidya Baskar Book Depot, Benares)

Paper VIII — Essay on an advanced literary subject

URDU

There shall be the following *eight* papers of which the Essay paper and one paper on detailed and critical study of special author or period must be taken in the Final Examination, and out of the remaining *six* papers, *four* may be taken in the Previous Examination and the other *two* in the Final

Paper I — Modern Texts

Poetry —

1 Qasid Aziz Lucknavi (First five Qasidas)

- ۱ مائات حانی منظومہ اگرہ ادتار پروس اگر
 - ۲ دیوان شام ار صورا ذائق قریائش لکھنوی
 - ۳ شعلہ و شمع ار حوش میلج انانی
 - ۴ نال حدریک ار ذکتر (قتال)
 - ۵ حسرت مرانی مودہ عدالشاہور
- شائع کردہ سہ انتہائی عمدی پناشور حکیم دمی ررہ اگرہ

Prose—

- ۱ مصامیں (سور جلد چہارم) ادب و تصنیف مسائل
- ۲ مصامیں دورا رحمت اللہ نگ دہلوی
(حصہ اول)
- ۳ اناداد مہدی از مہدی حسن انادی
- ۴ کتبہ فہمی لہی ہے۔ ار علی عباس حسینی
- ۵ تصنیف حائے از درویش معنوں گورکھپوری

The following articles from خطبات مسرانا (published by Jagamohan Narain Mushran Retired Judge, 726 Vingfield Road, Lucknow) —

- ۱ شعرا کا بحر و مضمون
- ۲ سرسند صد ورثہ فاضل
- ۳ نثر کے کام
- ۴ جنگ عظیم اور یہاں دوسرا دوسرا لکچر
- ۵ گاندھی جی کا حکم دس
- ۶ ہندو مسلم اتحاد
- ۷ حاضرین مساعیرہ کا نام و مضمون

Paper II — Detailed and Critical Study of Special author or period —
GHALIB or Dr IQBAL

Books to be consulted for Special study of Ghalib —

- ۱ دادگار غالب اور مولانا حالی
- ۲ سچہ دیوان غالب اور مولانا حالی حیدر نظام طنائی
- ۳ سچہ نامہ غالب اور دادگار عبدالرحمان معصومی
- ۴ غالب اور دادگار عبداللطیف درویش جامع علمائے ہندوستان اد دکن
- ۵ سچہ نامہ غالب مولانا امتیاز علی عروسی
- ۶ غالب نامہ اور محمد اکرام
- ۷ حالات غالب اور داستان نارنج ارد ہرید ہاوند مس فادری
- ۸ غالب اور غلام رسول مہر
- ۹ مکتوبات غالب اور مہر برسات

Books suggested for Special study of Iqbal —

- ۱ سیرت اقبال از مراد علی محمد طاهر فاروقی (شائع کردہ قومی کتب خانہ لاہور)
- ۲ روح اقبال — از ڈاکٹر یوسف حس حان (ادارہ ادبیات آرڈر ہیدرآباد دکن)
- ۳ اقبال — (شائع کردہ انجمن برقی آرڈر دہلی)
- ۴ مقالات پریم اقبال — (شائع کردہ قومی کتب خانہ لاہور)

(5) The Poet of the East, by A Anwar Beg, (Qaumī Kutubkhana, Lahore)

(6) Aspects of Iqbal, (Qaumī Kutubkhana, Lahore)

(7) Iqbal's Educational Philosophy, K G Saidani (Jamia Millia, Delhi)

(8) Modern Islam in India by Prof Smith, Islamia College, Lahore (Chapters on Iqbal only)

Paper III — Principles of Criticism and the General History of Urdu Literature, etc

Hali Muqaddam i Shair o Shairi

Mohi Uddin Qadri Rooh e-Tanqid

Azad Abe Hayat

Abdus Salam Nadwi Sherul Hind Vols I & II

Hamid Hasan Qadri Dastan i Tarikh Urdu (Laxmi Narain Agarwal, Agra)

Majnoon Gorakhpuri Adab aur Zindagi (Second edition)

Salnama Nigari for January and February, 1942

Hamid Hasan Qadri Naqd o Nazar

Ihtisam Husain Tanqidi Jaizey Published by Idara Ishaat, Urdu, Hyderabad

Paper IV — Comparative Philology of Modern Indian Languages

Encyclopedia Britannica, Fourteenth edition (Articles on Grammar, Philology & Hindustani)

M Ahmad Uddin Sar Guzashite Alfaz

Khwaja Abdul Rauf Ishrat Islah e-zaban o Urdu

Paper V — Old Texts

Poetry —

انتخاب کلام مسہ مریہ مولوی عہد الحکمی لے دغاوی
 دیوں میں درد (صرف رانہ)
 کتاب ولی مریہ مولانا احسن مارہری
 (ردیف الف و م و سی)
 سحرالبان ہر حس
 سودا —

سنگہ دو اینے لیے کرنا ہے فانی آسمان
 ۲ حوں عہدہ آسمان کے مجھے تیر عوس حال
 ۳ مسئلہ فانی نہ مہوس کی ہو مسعود
 ۴ کہے ہے کاتب دوراں سے مہسی دھندل
 ۵ سوئے خاک نہ دھندلوتا صاب دسار

Prose —

۱ باغ و بہار میں اس دغاوی معہ مریہ مولوی عہدالحق بی لے
 ۲ سادہ عجائب

Paper VI — Mediaeval Texts

Poetry

دعویٰ المزار ۱
 ردیف الف م و نا ہا
 Dewan of Momin Gharzals only
 مدح بکلی و جراح عہدہ مولوی محسن کاکرروی
 روح بطائر (انتخاب کلام مہاں بطائر اکبر انانی) (دوسرا اندلس) مولانا مہر
 اکبر انانی

نصائد درق

۱ دل کہ اس دہر میں ہے گرسلہ ناز بیاں
 ۲ ندی میں تو سرور ہے خام سراپ تاب
 ۳ رہے سادہ اثر کعبہ لے بھرپور

- ۴ لاتا سرنگ سے ہے رنگ لئے چرخ معیل
۵ پائے نہ ایسا ایک بھی دن حشرِ امان

مرثیہ (ایس)

- ۱ حب وں میں سر بلند علی کا عام ہوا
۲ حب قطع کی مسافت شب الحاق ہے
۳ حب رک کو کھولے ہوئے لٹائے شب الی

Prose—

NAZEER AHMAD Majmua Lectures Vol I

- ۱ ادبی خطوطِ عالیہ مرتبہ سرور محمد عسکر لکھنؤ
۲ اشائے بیکھر مرتبہ انتظامِ اللہ صدیقی و ارشد مرتضائی پرنس اکوہ
۳ مصامیں مشلی (ادبی و ترقیدی) مطبوعہ مطبع معارف عظم گڑھ

Paper VII—[a] A Subsidiary Modern Indian Language ;

Or

[b] A Basic Language,

Or

[c] An additional author or period other than one offered
for Paper II

[a] Subsidiary Languages

Hindi—

Tulsidas Ramayan [Ajodhya Kand]
Harishchandra Satya Harishchandra
Maithili Saran Gupta Pinchavati
Prem Chand Prem Dwadesh

Morathi—

R Karlokar Sakuntala
N N Apte Usha Kal
N Kelkar Abhaya Kavayamala Part IV
G G Agarkar Vibundhamala Part I

Bengali—

Rabindra Nath Tagore Sonar Tari
Baukim Chandra Chatterjee Kapal Kundali
Hara Prasad Shastri Bharat Malil
D I Roy Shahjahan

(b) Basic Languages—

Arabic —

۱ بعد از این از ابتدا تا صفحه ۲۰

۲ تصوف و ذات النور - عبدالرحمان انور

Persian—

۱ منتخب مکاتب عالمگیری (رام ترانس اعل - کنسولر الاداناد

۲ ارسى گرامر از سند اسحاق على

۳ دکار اعظم حصه سوم (سا اند کملى بناسرر اگر

Paper VIII — Essay on an advanced literary subject

PHILOSOPHY

There will be seven papers. One of the papers shall be an Essay on a Philosophical subject. The Essay shall be taken at the Final Examination. Of the rest any three may be taken in the Previous and the remaining three will be taken in the Final. The Papers shall be as follows —

Paper I — Ethics

(a) *Modern Ethics*—

Bradley Ethical Studies

Rashdall Theory of Good and Evil

Or —

(b) *Ancient Ethics*—

Plato Republic—Jowett's translation (O U P)

Aristotle Nicomachean Ethics—Ross's translation (O U P)

Burnet Greek Philosophy—Thales to Plato

Paper II — Psychology

Woodworth R S Contemporary Schools of Psychology
(Methuen)

Macdougall Outlines of Psychology and Abnormal Psychology
(Methuen)

Note — Candidates are expected to know something of the attitude of Indian philosophy to the psychological problems of perception

Paper III — Modern western Metaphysics in its historical development

Taylor Elements of Metaphysic

Hume Treatise, Part I

Watson Selections from Kant (Critique of Pure Reason only)

Thilly A History of Philosophy (Modern Period only 1 e
from p 250)

Paper IV —Indian philosophy

Hiriyanna Outlines of Indian Philosophy

Das Gupta History of Indian Philosophy Vol I

Note —Students are expected to relate their study to modern tendencies of thought and for this purpose Joad's introduction is recommended It is not intended to be an additional text-book

Papers V and VI —Any two of the following —

(a) Logic

Joseph An Introduction to Logic (O U P)

Stebbing A Modern Introduction to Logic (Methuen),
Revised edition

(b) Special study of an Indian or Western Philosopher

Shankara Vedanta Sutras with Shankarabhashya Adhyaya I
Pada 1 and Sutras 1-4 Adhyaya II Padas 1 and 2

Denssegi The system of the Vedanta

Note —Students are expected to study the text, on which questions will be set

Or

Bergson Creative Evolution

(c) Philosophy of Religion

Pringle Pattison Idea of God

CaIRD Introduction to the Philosophy of Religion

James Varieties of Religious Experience

Paper VII —Essay

Under the Essay sufficient choice will be given on problems connected with the various branches of the subject

ECONOMICS

There shall be eight papers out of which a candidate shall be required to take four papers in the Previous and four papers in the Final Examination as specified below —

- I Of the following three papers either [a] or [b] shall be taken in the Previous and the other and [c] in the Final Examination —
- [a] Principles of Economics
 - [b] History of Economic Thought including the History of Socialism
 - [c] Essay
- II Of the following papers any three may be taken in the Previous and any two out of the remaining in the Final Examination —
- [a] Economic Development and Present Economic Conditions of India and England
 - [b] Financial Organisation
 - [c] The State and Economic Welfare
 - [d] Labour Problems and Social Welfare
 - [e] Rural and Municipal Economics
 - [f] Theory and Practice of Statistics
 - [g] Co operation
 - [h] Transport
 - [i] International Trade and Foreign Exchange

Note — Books marked with an asterisk to be read others only to be consulted

Paper I [a]—*Principles of Economics*—Theory of consumption Natural resources human beings and capital goods as economic factors Theory of population Organisation of industry Industrial combination Markets and trading Theory of value Joint product prices Monopoly price, Discriminating price Money and prices Theory of distribution Speculation Organised markets Forms of business organisation Control of monopolies Principles of Economic planning Scope and Method of Economics

Books recommended —

*Marshall Principles of Economics Books I, III and V

*Fisher The Nature of Capital and Income

*Pigou The Economics of Welfare, Part I

Clark Essentials of Economic Theory

*Taussig Principles of Economics

Wicksell Lectures on Political Economy, Vol 1

Carr Saunders World Population

Cole Principles of Economic Planning

Robbins The Nature and significance of Economics, [Macmillan]

Pigou Economics in Practice

Paper I (b) — *History of Economic Thought*, including the History of Socialism—Mercantilism The Physiocrats Adam Smith and the Manchester School, Malthus, Ricardo, Carey, Bastiat, Senior, Sismondi, List Utopian or Bourgeois Socialism Saint Simon, Fourier Owen Proletarian Socialism, Louis Blanc, Proudhon, John Stuart Mill, Marshall Economic Thought in the 20th century Scientific Socialism Rodbertus Lassalle, Karl Marx The German Historical School Roscher, Hildebrand, Knies, Schmoller The Austrian School Menger Wieser, Bohm Bawerk Modern Socialism

Books recommended —

*Haney History of Economic Thought

*Gide and Rist History of Economic Doctrines

Othmar Spann Types of Economic Theory

Cannan Review of Economic Theory

Brij Narain Tendencies in recent Economic Thought, (Delhi University)

Scott History of Economic Thought

Urangyi Sanger Economics in the 20th Century

Tugwell Trend of Economics

Markham History of Socialism

Paper I (c) — *Essay* A large number of general subjects shall be the topics for essay, out of which a candidate will have to choose one. These subjects should be so chosen as to have at least one from the subjects prescribed under Groups I and II in the course

Paper II (a)—*Economic Development and present economic conditions of India and England with special reference to the period after 1760* The Manor The Guilds The Domestic System The Agricultural Revolution. The Industrial Revolution A broad outline of the development in India of the Industries of Jute Cotton Sugar Iron Steel and Coal The Factory System Changes in Transportation and Marketing and their effects Similar material for India as far as possible Brief history of the inventions between 1760 and 1790 and their economic effects The State and labour The modern economic structure Trade Unionism Wage contracts Public finance Tariff The history of inventions and of the status of labour to be treated briefly from relevant chapters in Economic History of England by Meredith

Books recommended—

- *Meredith Economic History of England
- Veeru Anstey Economic Development of India
- *Gadgil The Industrial Evolution of India
- Knowles The Industrial and Commercial Revolution in Great Britain during the 19th Century
- Ashley Economic Organisation of England
- D H Buchanan Development of Capitalist Enterprise India

Paper II (b) — *Financial Organization*—

Social importance of money Principles of currency circulation Services and nature of money movements and distribution of money Value of money Stability of the value of money Credit and Measurement of variations in the value of money Deferred payments Bi metallism Convertible and inconvertible paper money

The Processes of inflation and deflation Their effects on the value of gold prices foreign exchanges purchasing power parity International trade and State finance Stabilisation of monetary standards Effects of International debts

Brief history of Indian currency up to 1893 Measures taken in 1893 and 1899 The gold exchange standard The gold standard reserve. Amalgamation of the gold standard and paper currency reserves Council and Reserve Council Bills The proposed gold bullion standard

Banking Organization, operation The cheque system Bank notes. Convertibility Reserve system fixed fiduciary and proportional The Indian banking system the Imperial Bank of India, Joint stock banks, exchange banks, Government Treasury system, indigenous banking, co-operative banks, saving banks The Reserve Bank

Books recommended—

Spalding Eastern Exchange, Currency and Finance
 Colo Money

E M Barnston Money and the Economic System

(Chapel Hill, The University of North Carolina
 Press)

Report of the Central Banking Enquiry Committee

Paul Einzig Monetary Reform

Basu Recent Developments in Monetary Theory and Practice

Crowther Money

Mahotra History of Indian Currency

Paper II (c) —*The State and Economic Welfare*—

This course is a study of the relative efficiency of public and private activities as a means to certain economic ends Taxes and other kinds of revenue Their effects upon production and distribution and their other effects Public Expenditure Its effects upon production and distribution the economic basis of expenditure for the security of life and property, for sanitation and education Loans and Budgets Social Insurance, including workmen's compensation and insurance against unemployment Government regulation of Production Adulteration Control of food and drugs Factory Legislation Prices and Monopolies State aid to industries Public Research and Information Bureau Government Control of Public Works and Public Utilities Indian Finance Decentralization Provincial contracts Changes since 1920 Meston award Financial position of the Provinces Financial changes under the Government of India Act 1935

Books recommended—

*Shirras The Science of Public Finance

Report of the Taxation Enquiry Committee

Dalton Public Finance

Pigou Economics of Welfare (Chapters dealing with Government control)

Indian Workmen's Compensation Acts

Indian Factory Acts

Silverman Economics of Social problems

Clow State and Industry

Thomas Federal Finance in India

B R Misra Provincial Finance from 1910-39

Adarkar Report on sickness Insurance in India

Consult —

Adarkar Federal Finance in India

I P C Report

Paper II (d) — *Labour Problems and Social Welfare* — Life of the Labouring Classes in Typical Indian Industries Wage and hours Trade Unionism Their Principles achievements and possibilities in England and India Labour disputes Arbitration and Conciliation Works Committees and Trade Councils Profit sharing Co-partnership and Producers Co-operation Social Welfare Work and Social Service Agencies in India Housing projects in India and England Deht and Co-operative Credit for Employees Unemployment Labour Agencies and Labour Exchanges (Social Insurance Workmen's Compensation and Factory Legislation which are included in the course are to be reviewed briefly) Methods of paying wages

Books recommended—

Cole History of Working Class Movement in England

Parts I—III

*Pigou Economics of Welfare part III

A Williams Co-partnership and profit sharing

Reports on Social Welfare Work of the Calcutta and Bombay Leagues The Tata Iron and Steel Company and the British India Corporation Kanpur

Nettlefold Practical Housing

*Report of the Indian Labour Commission

Industrial Labour in India (I 'L O)

Richardson Industrial Relations in England (I L O)

Beveridge Social Insurance in England

Beveridge Social Security plan

Adarkars Report on sickness Insurance in India

paper II (c)—*Rural and Municipal Economics* —

Land Tenures Agriculture Improvements Irrigation and Communica-
tions The importance and possibilities of village industries District
Board finance - Contrast between Rural and Municipal Problems Con-
gestion Town Planning Building Regulations Sanitation Municipal
Finance Consolidation and sub-division of holdings 'Live stock and
Agriculture Water power Marketing of Agricultural products Financing
of Agriculture Short and long term loans Land mortgage banks Forests
Soil erosion Famines History , preventive and remedial measures
Village industries present condition, causes of decay, lines of improvement
State in relation to Agriculture Demonstration farms

Books recommended—

Darling The Punjab Peasant in Prosperity and Debt

Nourse Agricultural Economics

Baden powell Land Revenue System of British India

U P District Board Act

U P Tenancy Act, 1939

Iyer Municipal Trading (Allen and Unwin)

Gangulee Trends of Agriculture and population in the Ganges
Valley (Rama Krishna & Sons Lahore)

Report of the Royal Commission on Indian Agriculture

Baljit Singh Land of the Two Rivers

Misra Land Revenue Policy in U P

Nanavatee and Abjance Indian Rural problem

Dr M P Sharma Local Self Government in U P

Buel and Others Municipal Finance

paper II (f)—*Theory and Practice of Statistics*

scope and utility of Statistics, Enumeration, compilation and tabulation of
data, Averages Dispersion, Skewness, Graphic Method Accuracy, Index
numbers Interpolation, Association Continence Correlation Sampling
Common errors in Statistics

Books recommended—

- Bowley Elements of Statistics
 Bowley Elementary Manual of Statistics (Second edition)
 Yule An introduction to the Theory of Statistics
 Harvard Economic Series—Review of Economic Statistics
 Secrist Introduction to Statistical Methods
 Statistical Abstracts for British India
 Boddington Statistics for Commercial Students
 Bowley and Robertson Report on the Census of Production in India
 Mill Statistics
 Ghosh and Chaudhari Statistics—Theory and Practice
 P. J. Thomas and Sastri Agricultural Statistics in India

Paper II (g)—Co operation

Historical—Robert Owen Communitistic Colonies The Rochdale Pioneers The English Co operative Whole sale Society Raiffeisen and Schnlze Delitzsch systems Outline of Irish Swedish and Danish systems

THEORY—Co operative Production Industrial Co operation Co operation in Agriculture Co operative Marketing Co operative Distribution Co operative Credit

INDIAN—Co operative Organization Primary Rural Societies Provincial and Central or District Banks

Books recommended—

- *C. I. Fay Co operation at Home and Abroad Vols I and II
 Kaji Co operation in India
 H. Calvert The Law and Principles Co operation in India
 *Report of the Mc Lagan Committee on Indian Co operation
 John Matthai Agriculture Co operation in India
 Talmali Co operation in India and Abroad
 Indian Co operative Review [Madras]
 V. Ramdas Pantam Indian Co operative Directory

Paper II (h)—Transport

RAILWAY—Capital and working expenses Application of the laws of productivity Combination Competition and monopoly in transport

Determination of rates and fares Classification of goods State regulation of rates and fares State ownership and management

INDIAN RAILWAYS—Present situation, Finance Controlling authority Determination of rates and fares Systems of management

ROAD—Transport of goods and merchandise Types of vehicles Rural transport City transport The motor bus The tramway Competition and monopoly in road transport Determination of rates and fares Classification, administration and maintenance Taxation of road vehicles Water transport—Inland and oceanic

WATERWAY—Inland and coastal (Indian)

Books recommended—

*Douglass Knapp Outlines of Railway Economics

*Ackworth Elements of Railway Economics

*Marshall Industry and Trade Book III Chapters 3-6

*Fenelon Economics of Road Transport

Fenelon Transport Co-ordination

Srinivasan Theory of Rates and Fares in India

Kirkness and Mitchell Report of the Road and Railway Competition Committee

Co-ordination and Development of transport (Final Report) H. M. S. Office, London 1941

Proceedings of the Railroad Conference, 1933

The Indian Motor Vehicles Act 1939

Wedgwood Committee Report on Indian Railways

S. N. Hajji Economics of Shipping

Fenelon Economics of Rail Transport

Part II (1) *International Trade and Foreign Exchange* —

International trade theory, comparative costs Interpretation in terms of goods and prices Advantages and disadvantages of International trade Effects of the operation of the laws of increasing and diminishing returns upon international trade International value Money in International trade Effects of price variation on the course of international trade

Foreign Exchange —Par of Exchange Mint par of exchange in cases of currencies of different metals and inconvertible paper money Fluctuations of exchange rates causes and correctives

Tariff Policy—Free trade protection Imperial preference dumping
Books recommended—

- Bastable *Theory of International Trade*
Tausig *International Trade*
Clare and Crump *A P C of Foreign Exchange Report of the
 Indian Fiscal Commission*
Barratt Whale *International Trade*
Paul Finzi *Exchange Control*
Iaul Einzig *Exchange Clearing*
Bertil Ohlin *Interregional and International Trade*
Thomas *Principles and Arithmetic of Foreign Exchange*
Kundleberge *International Short term Capital Movements (Colu
mbia Un Press)*

HISTORY

- Paper I—Modern Political Theory (from Herbert Spencer to the present day) and Institutions including the Modern Constitutions of England Canada U S A Switzerland and France
LASKI *Grammar of Politics Part I*
BARKER *Political Thought in England—From Spencer to the Present Day*
FINER *Theory and Practice of Modern Government (abridged edition in one volume)*
F W COKER *Recent Political Thought*
E BARKER *The Citizen's Choice*
- Paper II—A selected period of English History—1815—1914
MARKIOTT *England Since Waterloo*
MARRIOTT *History of our own times*
Cambridge History of British Foreign Policy (relevant portions)
WOODWARD *The Age of Reform (O U P)*
STRACHEY *Victoria*
TREVELYAN *British History in the Nineteenth Century*
The Cambridge Modern History (relevant portions)
GILBERT SLATER *Making of Modern England (New edn)*
R C K ENCOR *England 1870—1914 (O U P)*

RAMSAY MUIR A Short History of the British Commonwealth,
Vol II

Paper III —A selected period of European History

(a) Revolutionary and Napoleonic Era, 1780—1815

MADELIN French Revolution

MADELIN The Revolutionaries

FOURNIER Napoleon

ACTION Lectures on the French Revolution

YOUNG Travels in France

FISHER Bonapartism

Cambridge Modern History, Vols VIII and IX

MADELIN The Consulate and the Empire, Vols I and II

ELTON Revolutionary Idea in France

Or

(b) Contemporary Europe, 1871—1914

TURNER Europe Since 1870

ROSE Development of European Nations

Cambridge Modern History, Vol XII

GOOCH History of Europe

GOOCH Before the War Vol I

Papers IV and V — One of the following periods of Indian History, each
period comprising two papers —

A —ANCIENT INDIA

(a) The Maurya Empire

KAUTILYA Arthashastra

MEGASTHENES Indica

Cambridge History of India Vol I

BHANDARKAR Asoka

MUKERJI Asoka

HULTZSCH Inscriptions of Asoka (Revised Edition)

H C ROY CHOWDHURY Political History of Ancient India, 193
edition (relevant portions)

BHARGAVA Chandra Gupta Maurya

R K MUKERJI Chandra Gupta and his times

(b) The Gupta Empire

FLERT Gupta Inscriptions

ALLAN Gupta Coins

FAHREN Travels [tr by Giles]

- H C ROY CHOWDHURY Political History of Ancient India 1938
 edition (relevant portions)
 R G BASK History of North East India
 R D BANERJEE Age of the Imperial Guptas
 BASUDEO UPADHAYA Gupta Samrajya ka Itihas (Indian Press
 Allahabad ,

B — MEDIAEVAL INDIA

- (a) Pre Mughal India 1200 — 1566 [Political History of Provincial
 Kingdom excluded]
 ELLIOT AND DOWSON History of India Vols II III and IV
 BRIGGS Rise of Mohammedan Power
 R P TRIPATHI Some Aspects of Muslim Administration
 ISHWARI PRASAD History of the Qaraunah Turks in India
 TODD Annals and Antiquities of Rajasthan [ed by Crooke]
 Tabakat-i-Nasiri [translated by Raverty]
 KING History of the Deccan
 Ibn Batuta (translated by Lee)
 Cambridge History of India Vol III
 DORN History of the Afghans
 MUHAMMAD HUSAIN The Rise and Fall of Muhammad Bin Tughlaq
 DR HABIBULLAH Foundations of Muslim Rule in India
- (b) Mughal India Babar to Jahangir
 Memoirs of Babar
 Humayun Nama
 ABUL FAZAL Akbar Nama
 ABUL FAZAL Ain-i-Akbari
 Memoirs of Jahangir
 ELLIOT AND DOWSON History of India Vols IV—VI
 R P TRIPATHI Some Aspects of Muslim Administration
 Cambridge History of India Vol IV
 M Roy Chowdhury Din Ilahi

Or

C — MODERN INDIA

- (a) Indian History from Clive to Wellesley
 Cambridge History of India Vol V
 FORREST Clive
 JONES Warren Hastings

FORREST Selections from papers of the Governors

General—Warren Hastings and Cornwallis

OWEN Selections from Wellesley's Despatches

ROBERTS Life of Lord Wellesley

The Fifth Report (Firminger's Edition)

Poona Residency Correspondence Volume VIII, Daulat Rao
Sindhia and North Indian Affairs (1794—1789), edited by
Sir Jadu Nath Sarkar Volume IX Daulat Rao Sindhia and
North Indian Affairs (1800—1803) edited by Dr Ragubir
Singh

NANDALAL CHATTERJEE Mir Qasim

C DAVIS Administration of Warren Hastings

CHATTERJEE Verelst's Rule in India [Indian Press, Allahabad]

ASHIRBADI LAL Shuja ud Daulah

(b) India under the Crown, with special reference to Constitutional
Development

R C DUTT India in the Victorian Age

RONALSHAY Life of Lord Curzon Vol II

LORD MORLEY Recollection Vol II

BANERJEE A Nation in the Making

KEITH Constitutional History of India

Cambridge History of India VI VI

Paper VI —A special study paper, one of the following —

(a) The History of the Marathas 1627—1761

SIN Administrative System of the Marathas

RANADE Rise of the Maratha Power

GRANT DUFF History of the Marathas [O U P]

ELLIOT AND DOWSON History of India Vols VII and VIII

SARDISAI Main Currents of Maratha History (Revised edition)

SINHA Rise of the Peshwas

SEN Military System of the Marathas

SARKAR Shivaji and His Times (Revised Edition)

SIR J N SARKAR The House of Shivaji

Or

(b) Economic History of India under British Rule

R C DUTT Economic History of British India (1757—1837)

- R C DUTT Economic History of India in the Victorian Age
 GADGIL Industrial Evolution of India in recent times
 ANSTEY Modern Economic Development of India
 SINHA Economic Annal of Bengal
 JETHAR AND BERRY Indian Economics
 WADIA AND MERCHANT Our Economic Problems (The New York
 Coy Bombay)

Paper VII—Essay

POLITICAL SCIENCE

There shall be *seven* papers including one on Essay. The Essay must be taken in the Final Examination. Of the rest any *three* may be taken in the Previous and the remaining *three* in the Final.

Paper I—Ancient and Mediæval Political Thought

The Sophist—Socrates Political Thought of Plato and Aristotle Epicureans and Stoics Roman Political Thought The problem of Church and the State in the Middle Ages The Mediæval Theory of Corporations Feudal Theory Theories of the Councils and Movement

DUNNING A History of Political Theories Vol I

BARNER Plato and His Predecessors

SABINE A History of Political Theories

GROSSMAN Plato to day

NETTLESHIP Lectures on Plato's Republic

GIERIE Political Theories of the Middle Ages with Maitland's Introduction

HERRANSHAW Some Mediæval Thinkers

For Reference—

PLATO The Republic

ARISTOTLE Politics (Welden's Introduction)

CARLYLE Mediæval Political Theory in the West

FIGGIS From Gerson to Grotius

Paper II—Modern Political Thought

Reformation and Renaissance—Theories—Machiavelli Bodin Grotius Theories of Contract and Natural Right—Hobbes Locke and Rousseau The Historians—Vico Montesquieu and Burke The Utilitarians—Hume Bentham and Mills The Evolutionists—Spencer and Huxley

The Idealists—Kant Hegel, Green, Brodley and Bosanquet The Socialist Thought Pluralism and Fascism

DUNNING A History of Political Theories Vols II and III

SABINE A History of Political Theories

MILGRAM AND BARNES A History of Political Theories, Recent Times

COHLER Recent Political Thought

VAUGHAN Studies in the History of Political Philosophy, Vols I and II

HOBHOUSE Metaphysical Theory of the State

For Reference

HOBBS Leviathan

LOCKE Civil Government

ROUSSEAU Social Contract

MILL Essays on Liberty, Representative Government etc

GREEN Lectures on Principles of Political Obligation

BOSANQUET Philosophical Theory of State

LASKI Grammar of Politics

FOLLET The New State

RUSSEL Roads to Freedom

Paper III—Public Administration

The scope and nature of Public Administration Relations between administration legislature and judiciary Legislative and Judicial powers of the administration in England and India Organization of departments Chief Departments in England and India Internal organisation of a Department Organization of personnel The Civil Service in England and India—Recruitment—Training—Promotion—Discipline, etc Public Service Commissions in England, India and Dominions Financial organization in England and India—Budget procedure and method Audit systems in England and India Local Self Government—England India America, etc

WILLOUGHBY Principles of Public Administration

D BURNS White Hall

H FINF British Civil Service

T I HEATH The Treasury

GYAN CHAND The Financial System of India Manual of Procedure of the Legislative Assembly

Government of India Act and Rules made thereunder
 HERMAN FINER English Local Government
 K T SHAH India Municipalities
 WATTAL A B C of Federal Finance

Paper IV —(a) Modern Constitutions of India Great Britain

France Australia U S A Italy Russia and Japan

VARMA AND SHARMA Government of India

OGG English Government and Politics

MUNRO Governments of Europe

LASKI Parliamentary Government in England

PUELL New Governments of Europe

MAXWELL The Soviet State

QUIGLEY Japanese Government and Politics

H LASKI American Presidency

FINER HERMAN Theory and Practice of Modern Governments
 2 Vols

Or

(b) Political Institutions—Ancient Mediæval and Modern

The rise and development of ancient city state The Roman Empire
 and Provincial Administration The papacy The Holy Roman Empire,
 Feudalism Mediæval Guilds The rise of Modern Nation State Parli-
 amentary and Presidential Governments Unitary and Federal Govern-
 ments The Legislature The Executive and the Judiciary Direct Legisla-
 tion Party System Methods of Representation Administrative Law
 Judicial Review of Legislation The Corporative State The Soviet
 State

WARD FOWLER City States of Greeks and Romans

SIDGWICK Development of European policy

JENKS The State and Nation

FINER Theory and practice of Modern Governments 2 Vols

MAXWELL The Soviet State

Paper V and VI—any two of the following —

(1) Ancient Indian Political Thought and Institutions

KAUTILYA Arthashastra (Translated by Shastri)

Mahabharata Santiparvam (Rajadharma)

Manu smrit Chapter VII

BENI PRASAD Theory of Government in Ancient India

BENI PRASAD The State in Ancient India

K P JAYASWAL Hindu Policy

WISHWANATH International Law in Ancient India

RAMCHANDRA DIKSHITA Hindu Administrative Institute

Cambridge History of India, Vol, I, Chapters IV, V, X, XI and XII

(2) Development of Modern Indian Constitution (1858 to the Present day)

Government of India Act, 1858 Indian Councils Acts 1861, 1892 and 1909 Montagu Chelmsford Reforms, 1919 Government of India Act, 1935 Development of the Indian Legislature Governor-General's Council Relation between Government of India and Home Government Central—Provincial Relations—Legislative, Financial and administrative Evolution of Self Local Government Development of Nationalism Indian States and their relations with the Paramount Power

Sapre The Growth of the Indian Constitution and Administration

P Mukerji Indian Constitutional Documents

G N Singh Indian States and the Government of India

G N Singh Landmarks in Indian Constitutional and National Development

Keith Constitutional History of India, 1600—1935

Government of India Act 1935

Rules made under the Government of India Act

(3) Islamic Political Thought and Institutions

Arnold The Caliphate

Von Kremer Contributions to the History of Islamic Civilization

Ibn Khaldun Muqaddameh

Abul Rahim Muslim Jurisprudence

Aghaides Theories of Musalman Finance

Cambridge Medieval History Vol II Chapter X

Vol III, Chapter XVI Vol IV, Chapter X

(4) Ancient and Medieval Political Institutions

Sidgwick Development of European Polity

Greenidge Greek Constitutional History

Greenidge Roman Public Life

Arnold Roman Provincial Administration

Cambridge Ancient History (relevant chapters)

Jenks Law and Politics during the Middle Ages

(5) International Relations

Rise of modern Imperialism Partition of Africa China and the rest of Asia American Policy in Central and South America The Monroe Doctrine The Triple Alliance and the Triple Entente The Eastern Question The Great War and the Peace Treaties The League of Nations The Movements for the establishment of a system of international security The Locarno Treaties The Kellogg Pact The Rise of Nazism in Germany Franco Soviet Alliance The Far East Politics Italo Abyssinian War The Munich Pact and the Second Great War

Hardy A Short History of International Affairs

Carr International Relations since the Peace Treaties

Emery and Simons The Great Powers in World Politics

P. Treat The Far East

Pears Higgins Studies in International Law and Relations

Luell International Relations

Toynbee Survey of International Affairs

Howard Ellis The origin structure and the working of the League of Nations

Streit Union Now

Gibbon Introduction to World Politics

Moon Imperialism and World Politics

Schumann International Politics

Sharp and Kirk Contemporary International Politics

(6) Principles of Sociology

Giddings Principles of Sociology

Tyler Primitive Culture

Hobhouse Social Development

Ginsberg Social Psychology

McDougall The Group Mind

Crahan Wallis The Great Society

(7) Political Thought in the XX Century

Problems of Democracy and School of Socialism Instinct in Politics

The psychologists Pluralism Group Organization Public Opinion

Theories of Representation Fascism

Wallas Human Nature in politics

Burke Political Thought from Spencer to To day (H.U.L.)

Laski The State in Theory and Practice

Lippman Public Opinion

Cole Social Theory

Follet The New State

Duguit Law and Modern State

Krabbe Modern Idea of State

Strachey Theory and Practice of Socialism,

Elhot Pragmatic Revolt in Politics

Coker Recent Political Thought

- Merriam and Barnes Political Theories Recent Times

Paper VIII—Essay

GEOGRAPHY

(PREVIOUS)

Paper I—Principles of Physical Geography

- (1) The Earth as a planet its movement and relation to the sun,
Distribution of insolation
- (2) The Atmosphere Pressure temperature precipitation, world
factors of climate and climatic types
- (3) Oceans
- (4) Lands Materials of the earth's crust crustal movements forces
of erosion, land forms structure of the earth evolution of land
forms vegetation types

Books recommended—

Tarr and Martin College Physiography

Salisbury Physiography

Hobbs Earth Features and their meanings

Tarr Study of the Scientific Scenery

Jolly Surface History of the Earth

Suess Face of the Earth

Coleman Ice Ages

Ramman Soils and their Classification

Brooks The Weather

Kendrew Climate

Kendrew Climate of the Continents

Austin Meller Climatology

De Lapparant Physical Geography

Paper II — Principles of Human Geography

(1) Content and aims of Human Geography — The Scope and interrelation of racial social economic and political aspects of Human Geography
Its place among Social Sciences

(2) Types of physical Environment considered from the standpoint of Human life primitive use of physical Environment

(3) Outlines of Racial Geography Meaning of the term race Criteria of racial types physical characters and racial types considered as an adjustment of physical environment Association of mental and other traits with different physical types the extent to which racial classification is possible and useful movement and distribution of chief racial types

(4) Some aspects of the Human Geography of India Outlines of the racial and social geography of India its relationship with the political geography and larger features of the economic life of the country a survey of Indian problems

Books recommended —

Vidal Blache Principles of Human Geography

Brunhes Human Geography

Pokhy Scope and Aims of Human Geography

Fleure Human Geography in Western Europe

Scuple Influences of Geography Environment

De Preuille Les Societies Africaines

Demolins Comment La Route Cree le Type Social

Gantiers Nomad and Sedentary Types of N^W Africa

Arbos Geography of Pastoral Life

Ton Forests and Human progress

Febre Geographical Introduction to History

Wissner Man and Culture

Fleure Races of Mankind

Haddon Races of Man

Krober Anthropology

Faargneve Geography and World Power

Paper III — Regional Geography of Asia

Structure relief important types of rocks their distribution and influence on topography distribution of chief types of land forms their

influence on the distribution of population Climatic factors and climatic types , Natural and Human Geography , Distribution of Natural Vegetations , Forest and their economic products , minerals sources of power and its relationship with industrial development Trade and Routes Chief racial characteristics and degree of adaptability to environment , Geographical background of modern political background—

Books recommended—

Stamp Asia
 Bergsmarch Economic Geography of Asia
 Moulton Japan
 Uchida Industry and Trade of Japan
 Cressey Geographic Foundation of China
 Buxton China
 Gregory Structure of Asia
 Little Far East

Or

Regional Geography of Europe with British Isles in greater detail

Structure, relief, important types of rocks their distribution and influence on topography Distribution of chief types of land forms, their influence on the distribution of population Climatic factors and climatic types within the country , Natural and Human Geography , Distribution of natural vegetation , Forests and their Economic products , Sources of Power and their relationship with industrial development Trade and Routes , Chief racial characteristics and degree of adaptability to environment , Geographical background of modern political environment

Books recommended—

Blanchard and Visher Economic Geography of Europe
 Blanchard and Crist Geography of Europe
 Shackleton Europe
 Laborde Western Europe
 Newbigin Mediterranean Lands
 Cundal Western Europe
 Partsch Central Europe
 Milkhaevlov Soviet Geography
 Semple Geography of Mediterranean Lands
 Newbigin Some Geographical Aspects of the Balkan Peninsula

Books recommended for British Isles

Mackinder Britain and British Seas

Jones North East England

Bygott Eastern England

Ogilvie Regional Maps on Great Britain

Stamp and Beaver British Isles

Paper IV—Any one of the following —

(1) The three Southern Continents

(2) Economic Geography

(3) Geomorphology

(4) Climatology

(5) History of Geographical Knowledge and Discovery

FINAL

Paper I — Regional Geography of India

Books recommended—

Vera Anstey Economic Development of India

Blandford Climate and Weather of India Burma and Ceylon

Rusley Peoples of India

D N Wadia Geology of India

Wadia and Joshi Wealth of India

Brown Mineral Wealth of India

Census Report of India

Holdich India

Report of the Royal Commission on Agriculture and Irrigation

Vera Anstey Trade of the Indian Ocean

Imperial Gazetteer Parts I II and III

Indian Year Book

Industries Year Book

Papers II and III—Any two of the following excluding the ones offered for the Previous Examination —

(1) Regional Geography of the three southern Continents

Structure, relief, important types of rocks and their distribution and influence on topography, Distribution of the chief types of Land forms, their influence on the distribution of population Climatic factors and climatic types within the continents, Natural and Human regions Natural Vegetation Forests and their Economic Products Minerals sources of power and relationship with industrial development Trade and Routes; Chief racial characteristics and degree of adaptability to environment Geographical background of Modern political problems

Books recommended—

Laborde Australia, New Zealand and Pacific Islands

Taylor Australia

Suggate Australia and New Zealand

Year Book of Australia and New Zealand

Fitzgerald Africa

Suggate Africa

Strentz and Marbat Vegetation and Soils of Africa.

Knox Climate of the Continent of Africa

Sullivan Economic Geography of South Africa

Official Year Book of the Union of South Africa.

Year Book of East Africa

Shanahan South America

Whitbeck Economic Geography of South America

Jones Continent of South America

Jefferson People of Argentine Pampas

(2) Economic Geography

Study of Geographical factors affecting production of raw materials and foodstuffs Distribution of manufactures Development of power resources Agricultural Products Consumption and Exports Forests and their Products. Trade and transport

Books recommended—

Rudmose Brown Principles of Economic Geography

Huntingdon Williams and Valkenburg Economic and Social Geography

Huntingdon, Williams and Valkenburg Industrial Geography

Lawett Economic Geography of the British Empire

Sargent Seaways of the Empire

Pusell Smith Industrial and Commercial Geography

Chisholm Commercial Geography

Colby Source Book of the Economic Geography of N America

(3) Geomorphology

Theories accounting for the present distribution of land and water
Interior of the Earth Isostasy Origin and Development of major
types of relief features Evolution of different types of land forms and
study of their characteristics

The Earth as a Planet Birth of the Earth

Theories of Cosmogony

Surface History of the Earth—Iostasy

The Earth & Interior—Seismology

Theories of Interior Building

The Alpine Masses

General Principles of Paleogeography

Tectonics and History of Continents and of the Asiatic and Pacific
Ocean

Books recommended—

Shaw Face of the Earth

Wegner Origin of Continents and Oceans

Jolly Surface History of the Earth

Daly Our Mobile Earth

Jeffreys The Earth

Chamberlain The Origin of the Earth

Davidson The Two Solar

Davidson Manual of Seismology

Withers Building of North America

Collat Structure of the Alps

Haug Traité de Géologie

Argand La technique de L'Asie

(5) Climatology

Distribution of the elements of climate and the variation Diurnal
seasonal and Annual Weather types—their causes and effects Weather
conditions of the Upper Air Conditions of local circulation Precipitation
and its causes and its different forms Study of climatic types of India in
detail Weather Forecasts

Books recommended—

Shaw Drama of Weather

Shaw Forecasting Weather

Abercrombie Weather

Miller Climatology

Kendrews Climate

Kendrews Climate of the Continents

Brooks Evolution of Climate

Brooks Climate through the Ages

(6) History of Geographical Knowledge and Discovery

Growth of Geographical knowledge, Voyages and maritime discoveries

Modern exploration in Asia, America and Africa, Polar and Himalayan Expeditions

Books recommended—

Warrington Ancient Explorers

Burton Discovery of the Ancient World

Newton Travel and Travellers of Middle Ages

Newton The Great Age of Discovery

Sykes A History of Exploration

Dickinson and Howarth Making of Geography

Dickinson and Howarth The Background of Geography

Paper IV —Practical

1 Surveying—Chain Plane table Prismatic Compass, Clinometer

2 Map Work [1] Map Projections

[2] Interpretation of topographical and Climatological maps

[3] Preparation of Geographical and climate, Economic and population maps

[4] Large scale maps of the following regions to be studied in detail—

[a] Mountainous Kashmir Loh

[b] Plain Regions Allahabad

[c] Desert Regions Dhar

[d] Delta Region Sunderbunds

3 Interpretation of Weather Charts

Contour and Diagrams of Major Land-forms

Books recommended—

Hinks Maps and Survey

Steele Map Projection

Bylott Map and Map work

H. M. Stationary Officer Weather Map

Ormsby Mathematical Geography

B Ed EXAMINATION—1949

Paper I — Principles and Psychology of Education

SECTION A

1 Critical examination of the following aims of education: Learning, Morality, Culture, Individuality, Citizenship. What should be the aim of education in India in the light of the special features of the Indian situation?

2 Agencies of Education

(a) Formal: The School

(b) Informal: The Home, the Community, Religion, the State

SECTION B

1 Psychology and its bearing on Education: Modern methods of psychological study as applied to Education—*introspection, observation, experiment and psycho-analysis*

2 Heredity and environment as factors in education

3 The psychology of instincts and emotions: sublimation: bearing of the psychology of instincts on intellectual and moral education

4 General innate tendencies: suggestion, imitation, sympathy and play: their educational uses

5 Psychology of character

I. Innate bases of character

(a) Disposition: methods of balancing it

(b) Temperament and its modification

(c) Temper

II. Acquired elements of character

III. Principles and method of Moral Education

6 Psychology of the Unconscious and its educational implications

7 Attention and Interest: Causes of inattention: methods of arousing interest

8 Psychology of Cognition: Sensation and Sense Training, perception and the training of observation, imagination and reasoning—their educational uses and training

9 Memory and its effective use in education

10 Learning and its laws: fatigue, transfer of training

11 Stages of development: educational implications of the Psychology of adolescence

12 Intelligence—Spearman's Two factor Theory, Measurement of intelligence, Methods of dealing with the backward child Achievement, Tests and Tests of emotion and character

Books prescribed—

Ross Groundwork of Educational Psychology

Nunn Education, its Data and First Principles

Kenned Fraser Psychology of Education

Raymont Modern Education

Ryburn The Progressive School

Books recommended for reference—

Oliver Wheeler Creative Education and the Future

Jhon Modern Psychology

Thomson Instinct Intelligence and Character

Dumville Fundamentals of Psychology

Dongals and Holland Fundamentals of Educational Psychology

Sturt and Oakden The Psychology of Education

McDougall The Energies of Men

Averill Elements of Educational Psychology

C Miller The New Psychology and the Teacher

M J Mukerjee Indian Adolescence

Paper II—School Organization and Hygiene

1 *School site, plans and equipment for different types of schools*—School site, principles governing the construction of school buildings types of school buildings, equipment and furniture suited to each type use of the Hall, rooms for special subjects, especially for science drawing, geography etc types of schools large small urban, small town large town boys and girls

2 *Local Educational System*—The educational system of Ajmer Merwara, classes and grades of schools for general education curricula and aims

3 *Staff*—The headmaster and the school staff distribution of work subject and class teachers

4 *Time tables*—Arrangement and balance of subjects variation to suit special needs

5 *Classification and Promotion*—Classification of scholars methods of testing progress in various subjects and at different times class records and promotion conduct of examinations

6 *Discipline and effects of doing well and ill of different types and age ranges*—Discipline, true and false rewards and punishment methods

of dealing with children of different age ranges and of special types e.g. wilful quick tempered lazy sulky hypersensitive etc

7 *Hostels*—Hostels physical and moral health therein superintendence special problems connected with girls hostels

8 *Health Education*—Principles of health education Instruction in hygiene first aid and laws of health physical exercises and games for boy and girls different kinds of organised games and their organization use and abuse of tournaments and other forms of competition play grounds formal physical exercises principles underlying them and their conduct and supervision in school hours

9 *Extra curricular activities*—The organisation and value of extra curricular activities systems of pupil self government Co operative clubs the Boy Scout movement and other means of developing corporate life and habits of social service

10 *Libraries and Museums*

11 *Parental Co operation*—Co operation between the school the home and the community methods of securing parental co operation parent teacher associations Old Boys Days social service and extension of school facilities to the community

12 *The School Office*—Equipment staffing and records

13 *School Inspection*—Inspection including common defects in inspection

Hygiene

Health and physique of children as affecting and effected by education and school conditions Factors influencing health and growth direct and indirect means of cultivating good physical habits in schools e.g. postures in writing and oral lessons The hygiene of the school the classroom and its surroundings overcrowding of rooms lighting ventilation water supply sanitation of the hostel Simple accidents First Aid Junior Red Cross Objects and Methods of Medical Inspection

A General acquaintance with the structure and functions of the following systems skeletal digestive circulatory respiratory and excretory Defects of eye-sight and of hearing Personal cleanliness (e.g. cleanliness of hair nail teeth skin nose and throat) Causes of fatigue and the importance of rest Common minor ailments their identification and treatment The problem of malnutrition and diet Infectious diseases (including leprosy and tuberculosis) Disinfection

Books prescribed—

- Bry School Organization
 Ryburn The Organization of the Schools in India
 Muk-rjee Secondary School Organization
 Smith Hygiene for Schools
 Avery Text Book of Hygiene
 Lyster Hygiene of the School

Books recommended for reference—

- Bagley Class room Management
 Bagley School Discipline
 Smith Constructive School Discipline
 Bennett School Efficiency
 Johnson The Administration and Supervision of the High School
 Rayment Modern Education
 Pamphlets on School Organization (Gulab Singh & Sons, Lahore)
 The Educational Code of the Province
 Maccarison Food

Paper III—Method of Teaching

PART I

General

Subjects of the curriculum and reasons for their inclusion their relative importance at different periods of school life, correlation of subjects, variation in curricula to meet the needs of various types of schools and scholars of different ages—the Primary, Middle, High and Intermediate stages Transition

Methods of teaching in general, Inductive and deductive methods Heuristic method the collective lesson individual teaching teaching in sections group work, and individual work exposition and explanation questioning and answering dealing with answers methods of dealing with mistakes oral, written or in construction, etc narration and description Illustrations and illustrative aids use of the blackboard, diagrams relations between the scholar's own work and that of the teacher encouragement of private study and individual work by the pupil, differences in methods according to the stage of the pupil, Recent developments in methods, Montessori Dalton Plan Play way, Project method etc

Schemes of work—their preparation and methods of working out, single lessons and series of lessons notes—full and working notes revision methods and values

PART II

Methods of teaching the various subjects of the curriculum of Secondary Schools in India Provision and use of apparatus

(i) English—Early training in speech Phonetics and its use direct method Basic English Reading at various stages rapid reading silent and oral reading test work Consideration of the subject taught as a foreign language Dictation transcription and composition oral and written The teaching of writing Correction of work Literature—its place appreciation The teaching of prose and poetry in the three stages Grammar Translation the place of the mother tongue in teaching English

(ii) History—Why History should be taught in school work at different stages and selection of material for each stage essentials of teachers and pupils work making the Past real through proper emphasis on movements history room the teaching of civics Modern Developments and the teaching of History in school

(iii) Geography—The Modern conception of Geography the place of Geography in the school curriculum different stages and work at each stage Story and Pictorial Methods the place of picture models sketches and other material aids correlation of Geography with other subjects specially with Nature Study and hand work The Home Region Geographical Excursions Use of Maps

(iv) Mathematics—Methods and apparatus the teaching of principles application of principle practical oral and written work Correction of work Means of securing accuracy

(v) Science—Place of investigation and of information indoor and outdoor work books and their use bibliography selection of material for schools differently situated connection with gardening excursions

(vi) A Modern Indian Language—Means of securing accurate hearing and clear articulation through phonetics and drill the use of stories oral and written composition reading aloud silent reading recitation training in the use of books tests and more detailed study grammar and its place rapid reading initiation through prose and poetry of a taste for literature place of memorization in literature teaching aids to teaching The teaching of calligraphy and prosody

Books recommended—

(a) General

Davis The Young Teacher's Primer

- Green and Birchough A Primer of Teaching Practice
 Nancy Catty A First Book of Teaching
 Kenney The Teacher in the Making
 Oakden and Sturt Matter and Method in Education
 Raymont Principles of Education Chapters XI and XII
 Raymont Modern Education, Chapters VI and VII
 Smith and Harrison Principles of Class Teaching Chapters XIII
 and XIV
 T B Khan and M Siven Modern Educational Development

(b) *Special Methods*

Suggestions for the consideration of Teachers (Board of Education)

- Welton Principles and Methods of Teaching
 Mc Neo Instruction in Indian Secondary Schools
 Adams Modern developments in Educational practice
 Bossing Progressive Method of Teaching
 Adams Student's Guide

Paper IV —History of Education

A Western Education

The influence of the following educators on modern educational thought and practices

- 1 Rousseau
- 2 Pestalozzi
- 3 Froebel
- 4 Herbert
- 5 Spencer
- 6 Dewey

Books recommended—

- Graves A Student's History of Education
 Nurullah and Naik A Student's History of Education in India
 (Macmillan)
 Dewey (1) The School and Society (2) The School and the
 Child
 Monroe A brief course in the History of Education
 Boyd History of Western Education

B—Indian Education

A general review of Education in India from the beginning of the nineteenth century to the present day with reference to the following —

The Orientalist Policy up to 1835

Orientalist *versus* Anglicist Controversy 1835

The Despatch of 1854

Educational Development from 1854 to 1882

The Commission of 1882 and its results

The Foundations of the universities and their influence on Secondary Education

University Reforms 1904—06

Beginning of Compulsory Primary Education and subsequent developments in Primary Education

The Calcutta University Commission and its main recommendations about Secondary and University Education

The Indian Statutory Commission

Interim Report 1929

Abbott Wood Reports

Experiments in National Education

Present developments and trends—Education of Women Adult Education Basic Education etc

Books prescribed—

Siqueira Education of India

Keay Indian Education Ancient and Modern

Jam s Education and Statesmanship in India

Books recommended for reference—

Mayhew Education of India (selected chapters)

Paranjpa A Source Book of Indian Education

Fleming Schools with a Message in India

Verker Wardha Scheme

Quinquennial and Annual Reports of Education

Paper V (a) *Special Method Course in English*

- 1 The Place of English in the Indian Schools as a subject and as a medium of instruction
- 2 The Direct Method of Teaching English
- 3 Basic English its merits and demerits
- 4 Pronunciation Handwriting and Spelling
- 5 Intensive study of prose and poetry
- 6 The Rapid Reading lesson
- 7 Grammar
- 8 Translation.
- 9 Composition oral and written

10 Inspirational teaching

Books recommended—

- Palmer Principles of Language study
 Wyatt and Thomson Teaching of English in India
 Ryburn Teaching of English
 O Grady, Modern Language Teaching
 Champion Teaching of English
 Tomlinson Teaching of English
 Ogden Basic English
 Board of Education, Suggestions for the consideration of teachers
 Finch How to Teach English Composition
 Menzel Suggestions for the teaching or reading in India, (O U P)

(b) *Special Method Course in History*

1 Detailed Study of the following —

- A Meaning and Significance of History in School curriculum
 B Aims of Teaching History
 (1) In the Primary and Middle Schools
 (2) In the higher classes
 C Syllabus in History at different stages of School Education
 D Methods of Teaching History
 (1) Meaning and importance of the progressive *versus* regressive, periodic *versus* concentric and topical *versus* chronological order of treatment their merits and demerits
 (2) Place of the text book and oral lessons The dramatic narration
 (3) Place of standard and reference books in the teaching of History
 (4) The Source Method—its advantages and limitation—its possible use in the Indian schools
 (5) The value of illustrations, maps diagrams sketches, historical visits
 (6) Expression work in History for junior and senior classes F I
 Correlation of History with—
 (a) Literature
 (b) Geography
 (c) Manual Work and
 (d) Other subjects
 H Written and practical work to be done by the students —
 (a) Maps diagrams and models
 (b) Lesson notes and essays

(c) Drawing and collection of various kinds of historical illustrations and charts

(d) Collection of sources to illustrate certain topics

Books recommended—

Drummond History in Schools

Keating Studies in the Teaching of History

Firth Learning of History

Jorvis Teaching of History

Mackenzie Instruction in Indian Secondary Schools

Mence Instruction in Indian Secondary Schools

Memorandum on the Teaching of History

(c) *Special Method Course in Geography*

THEORETICAL WORK

A Place of Geography in the School curriculum

B Methods of teaching Geography in (a) the Primary (b) Middle and (c) High School classes

C Syllabus for (a) the Primary (b) Middle (c) Matriculation and (d) Intermediate stages

D Use of illustrative aids text books statistics

E Correlation with other subjects specially with Science Nature Study and History

F Equipment of the Geography Room Apparatus and Appliances The Geography Library Museum etc

Practical work

1 A few maps of topical interest or possessing other features of interest

2 Diagrams (on the black board as well as in the students note books) illustrating such topics as revolution seasonal migrations of the thermal equator Wind Belt etc

3 Record of weather observations

4 Two criticism lessons by each student

5 A course of at least 15 lessons by each student

6 Drawing up a scheme of lessons on geographical topics for the Middle or High Departments with notes of lessons

7 Attempting a few Geographical pictures

8 Clay models cardboard models and plasticine models of objects of geographical interest

9 Drawing up detailed syllabuses of work for the School classes

10 Essays on subjects of geographical interest to be discussed in the tutorial classes

11 Plane Table Survey

12 Training in the use of projection lantern and slides

Books recommended—

Garret Fundamentals of School Geography

Fairgrave Geography in School

Barker Geography in Education and Citizenship

Memorandum on the Teaching of Geography (Phillip)

Archer Lewis and Chapman Teaching of Geography in Elementary Schools

Walks Teaching of Geography

Suggestions for the consideration of teachers (Board of Education), latest edition

Stamp How to teach Geography

(d) *Special Course in Mathematics*

1 Place of Mathematics in the school curriculum

2 Methods

(a) Analytic and synthetic methods

(b) Deductive and inductive methods

(c) Heuristic and laboratory methods

3 Material equipment—library and apparatus

4 Curriculum in Mathematics

(a) Syllabus for different stages

(b) Practical and Mental Mathematics

5 Teaching of Arithmetic Algebra and Geometry, Aims, Methods subject matter, correlation with one another and with other subjects

6 The teacher of Mathematics—his qualifications and preparation

Books recommended—

For intensive study—

Young The Teaching of Mathematics

For extensive and general study—

Kapniswami Iyengar The Teaching of Mathematics in New Education

Hennings The Teaching of Arithmetic and Elementary Mathematics

Smith The Teaching of Elementary Mathematics

Schultz The Teaching of Mathematics in Secondary Schools

Special Reports on Educational subjects Mathematics
 Vol XXVI Board of Education England
 Smith The Teaching of Geometry
 Nunn The Teaching of Algebra
 Ballard Teaching the essentials of Arithmetic

(e) *Special Course in Physics and Chemistry*

A *Theoretical*

- 1 Place of Science in the school curriculum
- 2 Methods of Teaching Science with special reference

to —

(a) The Heuristic and Laboratory Methods

(b) The Concentric Method

- 3 The Science room and the laboratory—their equipment

- 4 Curriculum in Science

(a) Syllabus for the Middle High School and Intermediate sections

(b) Instruction in the class room—experimental demonstration

(c) Instruction in the laboratory—value of laboratory work notebooks technique of laboratory management

5 Teaching of Physics and Chemistry Aims methods subject matter correlation with other subjects applications to everyday life

6 Science teacher—his qualifications and preparation science library

B Practical

1 A course of 15 typical experiments from the High School and Intermediate syllabus in Physics and Chemistry

2 Elementary glass blowing fitting up apparatus

3 Preparation of a piece of simple apparatus involving wood work

4 Preparation of models charts graphs etc

5 Some useful laboratory arts preparation of varnishes silvering glass electroplating etc

6 Study manipulation and use of the following —

(a) The gas plant

(b) The optical lantern and epidiascope

(c) The motor and dynamo

(d) Electric bell installation

(e) Electric light installation

(f) Telephone installation

7 Excursions to (i) Power House (ii) Ice Factory (iii) Railway Workshop (iv) Water Works (v) Flour Mill

Books recommended—

Westaway Science Teaching

Brown Teaching Science in Schools

Smith and Hill Teaching of Chemistry and Physics

Ghoshal Manual of Science Parts I and II

Board of E in London Suggestions for Teaching Science

(f) *Special Course in General Science*, (Physics, Chemistry, Nature-Study and Gardening)

- 1 Aims and Values of the subjects,
- 2 Organization of syllabuses The place of Nature study and general science in the school curriculum
- 3 Methods of teaching
- 4 Correlation of science subjects with one another and with other school subjects
- 5 Planning of lesson notes
- 6 Aids in teaching—the laboratory, the Science library the school garden, the school museum and field trips
- 7 Equipment of the Laboratory and the lecture room
- 8 The place of excursions and gardening in Science teaching

Practical Work

- 1 At least 15 lessons under the guidance of the teacher in charge
- 2 Laboratory Work—
 - (a) A course of typical experiments from the High School subjects in Elementary Science of the Rajputana Board
 - (b) Preparation of models and apparatus
 - (c) Methods of collecting and preserving animals and plants The school aquarium and vivarium
 - (d) Collection and miscellaneous work

Books recommended—

Westaway Science Teaching

John Brown Science Teaching

Wyss The Teaching of Nature Study

Rennie Nature Study its aims and methods

Irwin Practical Home Gardening for India

*Special Course in Anatomy and Physiology of Human Body and Hygiene**Section A*

- 1 Reasons for the inclusion of Anatomy and Physiology of the Human Body and Hygiene in the curriculum methods of teaching the subject application to daily life correlation with other subjects

Aids to teaching election and purchase of apparatus home made apparatus library books and charts care and arrangement of apparatus school museum the laboratory and its equipment

Sufficient acquaintance with the following topics to allow understanding of physiological processes solutions including colloidal solution diffusion permeability of membranes osmotic pressure carbohydrates fats and proteins Rate of chemical change catalysis

Anatomy The human body in its entirety the skeleton muscular digestive circulatory respiratory excretory reproductive nervous and endocrine systems The candidates should have sufficient acquaintance with the human skeleton and muscles to understand the mechanical principles of movements and the relations of muscles to the skeleton A detailed knowledge of the morphology and nomenclature of the bones and muscles will not be expected

A general acquaintance with the physiology of the following systems Digestive circulatory respiratory excretory reproductive nervous and endocrine

3 Practical Work

- (i) Microscopical study of the following animal tissues from fresh preparation — muscle nerve cartilage blood and connective tissue
- (ii) General dissection of the various systems of a mammal (Rabbit rat or Squirrel)

Preparation of lesson notes maintenance of records

Preparations of charts models and graphs preservation of dissected specimens

Section B

HYGIENE

Air Composition of air ventilation and importance of pure air diseases caused by impure air

Water Composition of water sources of water supply, how water is polluted purification of water

Food Composition of food preservation of food cooking of foods

Health and infection Infectious diseases their methods of communication precautions against diseases

Personal Hygiene Cleanliness of body (hair nails teeth skin nose throat etc) clothing exercise, the use of drugs spitting.

Books recommended—

- WESTAWAY Science Teaching, Chapter on the teaching of Biology
 ETHEL POULTON The Teaching of Biology
 HUXLEY Physiology
 CHARLES BARNES Physiology, Public Health and Psychology
 C. BERESFORD Elementary Hygiene for India
 BEST AND TAYLER The Human Body and its Functions
 SMITH Hygiene

The paper will be divided into sections A and B. Candidates will be required to attempt four questions from Section A and two from Section B.

* [h] *Special Method Course in Urdu and Hindi*

- 1 Aims of teaching the mother tongue
- 2 Study and criticism of present day methods of teaching the mother tongue
- 3 The place of Grammar in the teaching of the mother tongue
- 4 Selection of text-books and school literature
- 5 Teaching prose
 - (a) Study of the various forms of prose
 - (b) Study and investigation of the methods of teaching prose
- 6 Teaching of poetry
 - (a) Study of the various forms of poetry
 - (b) Study and investigation of the Methods of teaching poetry
- 7 Appreciation of literature
- 8 Teaching of composition
- 9 Correlation among the various sub-divisions of the subject and with other subjects
- 10 Present day trends and tendencies in literature

Books recommended —

- Ballard Teaching the Mother Tongue
 Balmer Principles of Language Study
 Board of Education Suggestions for the consideration of teachers, chapter on the Teaching of English
 Assistant Masters Association Memorandum on the Teaching of English
 West Language in Education
 Chaturvedi Bhusha ki Shiksha

Special Course In Gardening and Nature

(a) *Special Course in Gardening—*

1 Aims of School Gardens

2 Soils Formation of Soils

Physical classifications of soils

Chemical classification of soils

Physical and Chemical properties of soils

Fertility and barrenness of soils

[Elementary knowledge of the above]

Kinds and classification of manures and fertilisers Care Value
and use of manures

3 Use of different kinds of garden implements

5 Elementary Botany Study of a plant seed root stem, bud
leaves and flowers their functions pollination etc various methods of
plant propagations — by seed cuttings budding layering grafting
Advantage of propagation by budding etc over propagation by seed in
certain cases

6 A few important garden pests and their remedies and the prepara-
tion of a few simple insecticides and fungicides will also be dealt with

7 Practical Work Seasonal cultivation of flowers and vegetables

Preparation of seed beds

Sowing of seeds

Preparation of composts for pots

Weeding transplanting of seedlings

Propagation by budding grafting layering and
cuttings

Preparing Garden Plans both for flower and
vegetables

(b) *Special Course in Nature Study—*

THEORETICAL WORK

(A) Place of Nature Study and Gardening in the School Curriculum

(B) Teaching of Nature Study with special reference to

(a) Natural phenomena

(b) Animal and plant life

(c) Mental and Cultural development

(C) Methods of teaching of Nature study and gardening in the Primary and Middle Sections of the School

(D) School museum and Nature Study garden Nature Calendar and record of weather observations Library

(E) Correlation with other subjects specially with Science, Geography Agriculture and Art

(F) Gardening—Different types of aims Systematic planning of different types of gardening Soil—its structure, kinds etc, Manures Necessity, time of, and Conservation Various Crops—Field, vegetable and garden of the district

(G) 6 essays on topics of interest in connection with the subject

PRACTICAL WORK

1 Nature—Study garden—its planning and maintenance Observation and record of plants grown in different season Study of animal life visiting the plots—helpful or harmful to plant life

2 Life history of frog, butterfly, fly and a mosquito Preparation and maintenance of an Aquarium and a vivarium

3 Habits and habitats of an Earthworm, butterfly, fish, frog, a bird and a rabbit Group life of Ants, bees, wasps and migratory birds Adaptation to environment

4 Study of flowering plant, Roots, stems leaves, flowers and seed Pollination and fertilization Seed dispersal

5 Adaptation of plants in water, desert and semi desert areas

6 Excursions to places for the study of the different characters in animal and plant life and collection of museum specimens

7 Planning, preparation and maintenance of the school museum

8 10-15 lessons under guidance must be given and their notes of lessons maintained for inspection

Tools Recommended—

Scottish students memorandum on the teaching of (a) Nature Study (b) Gardening

Bd of Education (London) Suggestions

Weston—Science teaching

Rennie—Nature study—its aims and method

Irwin—Practical Home Gardening for India

Special course in Rural Education

- 1 History of the growth of Primary Education in Rural Areas
- 2 Aims of Rural Education
 - (a) Preparing Children for a satisfying Rural life
 - (b) Preparing children for General efficiency by means of Rural Resources
 - (c) Developing a Broad Rural citizenship
 - (d) Developing the health of Rural Children
- 3 The Educational possibilities and needs of Rural children
 - (a) Better farming
 - (b) Better citizenship
 - (c) Better living—co operation
- 4 Curriculum of Rural School
 - (a) Utilization of Rural Environments
 - (b) Health—The Three R's
Sanitation
History Civics Geography
Agriculture—Crafts
Home making (especially for girls)
 - (c) Place of Crafts on Rural Schools and teaching by means of Crafts Selection of Crafts according to local conditions
- 5 Rural School Teacher—qualifications required
Training of Rural Teachers
 - (a) General Methods—co relation of studies with crafts
 - (b) Crafts—Clay Modelling Cotton spinning weaving and Durree making wool spinning making of woollen pull overs Jerseys etc
 - (c) Elementary Psychology
 - (d) Rural Economics (Elementary)
 - (e) Village Sanitation and Hygiene
 - (i) Sanitation—Biological Character personal environmental rural and urban differences advantages and disadvantages
 - (ii) Village houses—construction site architecture planning ventilation and height
 - (iii) Food—composition of the diet of the village people methods of cooking—Vitamins and protein etc in different foods Natural food reform Diets
 - (iv) Water—sources of drinking water quality pollution purification—The problem of water supply solutions Diseases caused by bad water

(v) Air we breathe necessity sources quality pollution Bacterial
Air borne diseases

(vi) Rural Reconstruction connected with all phases of village life

Economic

Social

Religious

Health

6 Organization, Control and Management of Rural Primary Schools,
Private District Boards, Municipalities

Inspection and Inspecting staff A D I's and D I's

Suggestions for improvement

Special Course in Physical Education

Purpose

The purpose of the course is to familiarise the teachers of general subjects with the aims and principles of physical education, so that they may get the necessary basis to understand the child as a whole and to educate both his mind and the body thereby maintaining a rational equilibrium. The future teacher should be able to conduct general programmes of physical education and recreation and understand the psychological and physiological background of his work. For this purpose, he should learn the fundamental principles of theory of physical education and do some practical work which will enable him to keep himself fit and to understand and demonstrate the exercises games, sports swimming and other activities, contributing towards the physical fitness of the child population.

Courses

The courses laid down below are meant to serve as a guide —

Theory

- 1 Aim of physical education in a scheme of the education of the child
- 2 Principles of teaching of physical education and the allied arts
- 3 Class commanding and Hindu tam terminology of exercises
The composition of different types of lessons of exercises and their adaptation to age sex, climate and other exigencies of the timetable
- 5 The faults in exercises and different methods of their correction

- 6 Detection prevention and cure of the various deformities of the body, common to the school child through medical gymnastics and massage
- 7 Short history of physical education in India and abroad
- 8 Playgrounds play centres public recreational ground scouting guiding youth movements hiking mountaineering and other similar activities and their organization
- 9 Measurement of physique and physical efficiency tests
- 10 Rule of minor games and sports and the chief points of coaching in different items
- 11 Indigenous exercises and defensive arts e.g. Kabaddi Lathi Gacaka Phari Lazim Ju Jitsu Asan Suryanamaskars etc
- 12 Aquatic sports—swimming water sports etc
- 13 Organization and administration of games sports and other physical education activities in and outside the school
- 14 The anatomical and physiological basis of exercises and sports
- 15 The total health of the child—the problem of healthy diet and proper nutrition of the children

Practical

The pupil teachers will be required to perform and gain proficiency in all the exercises prescribed in the following syllabuses—

- 1 Exercises for infants
- 2 Exercises prescribed for children from 6 to 12 years of age
- 3 Exercises prescribed in the syllabus for children above 12 years of age

Practice of teaching

Pupil teachers will be required to put in 20 periods of practice of teaching among different grades of boys which will include 8 periods of supervised criticism lessons. Besides this the students will learn the indigenous exercises and other defensive arts and swimming wherever possible and they will also teach these activities to the children under their charge.

Essays and other written work

The pupil teachers will be required to write at least 6 essays on different topics and will draw sketches and diagram of various exercises and games apparatus to be used by them.

Reference books recommended—

- 1 Syllabus of Exercises for Children from 6-14 years of age published by the Education Department U P

- 2 Syllabus of Exercises for Classes VII to XII issued by the Education Department U P
 - 3 Jacks, L P Education through Recreation
 - 4 Buck Rules of Games and Sports
Wood and Rowell Health Supervision and Medical Inspection of Schools
 - 5 Bogert—Nutrition and Physical Fitness
 - 6 Masani—Your Food
 - 7 Rathbone Corrective Physical Education
 - 8 Administration of Physical Education by J B Nash
 - 9 Calisthenics by S C Staley
 - 10 Anatomy and Physiology by J F Williams
 - 11 Tests and Measurements by J F Williams
 - 12 Physical Training Games and Athletics in schools
(A text-book for Training College students) by M B Davies
-

Special Course in Educational Handwork

The inclusion of Handwork in schools has been recognised by all leading educationalists to be introduced in schools

In India too, all the Progressive schools worth the name have included it in their courses of studies. They find it very difficult however, to find suitable teachers for this purpose

Most of the Handwork instructors are mere craftsmen, but not trained teachers

It has been felt that the pupil—teachers who possess special aptitude in Handwork, may be offered the choice of specialising in this subject so that they may be allowed to supervise Handwork in their respective schools

The sub-committee appointed by the Board of Studies in Teachers Training has submitted the following syllabus for such a course. Due consideration has been given to the time at the disposal of the students.

SYLLABUS

- 1 Aim of Handwork in Primary, Middle and High Schools
- 2 MEDIA suitable for the above three sections—
 - (a) For Primary Department Clay and Paper

- | | | | | |
|---------------------------|------|-------|-----------|---|
| (b) For Middle Department | Clay | Paper | Cardboard | and Fret work |
| (c) For High Department | Clay | Paper | Cardboard | Fret work
Wood work and Papier Mache |
- 3 Branches of Handwork a student to specialise —
- 1 Clay modelling
 - 2 Paper—folding and Cutting
 - 3 Cardboard work.
 - 4 Wood and Fret Work
 - 5 Practical Art (Drawing and Painting)

Students will be required to prepare models and specimens in the above

4 Educational values of Handwork and correlation with other school subjects

Books Recommended—

Cardboard modelling by Laxmiswar Sinha Hindustani Talimi Sangh Seagon C P

Handwork for Primary and Middle classes in Hindi by Amba Pra ed Srivastava

Handwork Teacher—Sardars School Gwalior (in Hindi) from I to VIII classes

Paper cutting and Modelling for Infants and Juniors by J E Tolson

Illustrative Model making for Schools by L Evans and J T Udale (Longmans)

Educational Handwork a complete and varied course for Schools by William Taylor

Modelling by Maria Petrie

Craft in Education by H R Blatia

Special Course in Domestic Science

Theory—

- 1 Place of Domestic Science in the School curriculum for girls
- 2 Subjects to be included in Domestic Science
 - (a) Physiology and Hygiene
 - (b) Home nursing and First aid
 - (c) Needlework house-hold sewing and mending
 - (d) Mother craft
 - (e) Food Values and Cooking

(f) Home Management,

(g) Laundry,

and the value of each in the Domestic economy

- 3 Methods of teaching the various branches, their correlation with each other and with other school subjects, their applications to daily life
- 4 Material aids for the teaching of Domestic Science Library books, charts, models and other apparatus required for the teaching of the various branches of the subject
- 5 Curriculum—Syllabus for the middle, high and intermediate sections
- 6 Qualifications of a successful teacher of Domestic Science

Practical

Physiology—examination of specimens sheep's heart lungs, liver, kidney, brain and microscopical study of blood and other slides

Hygiene—Excursions to Water-works and Slum areas, and examination of the city drainage and method of disposal of city refuse

First Aid & Home nursing Practice in the application of bandages and splints, and nursing the invalid

Cooking and Laundry—Practical work in these two subjects necessary and should be done as far as possible

Needlework Cutting out of garments by draft use of paper patterns designing & colour matching in embroidery

Mother craft Visit to a Child Welfare Centre

Home Management Practical work in household management is desirable and should be carried out if conditions permit
Preparation of models apparatus, charts & graphs
Maintenance of records

Books recommended —

- 1 Elizabeth Atkinson—The Teaching of Domestic Science,
- 2 Evelyn F. Jardine—Practical courses in Home craft (Methuen),
- 3 Evelyn F. Jardine—Practical Science for girls as applied to Domestic Subjects (Methuen)
- 4 F. W. Westaway—Science Teaching—Chap. XXIII XXIV XXVIII

- 5 Whipple—Hygiene of the Home (Grey)
 - 6 William S Sadler & Lena K Sadler—Diet & Food Value
 - 7 Major B N Khan—Nutrition
 - 8 Health Bulletin No 23
 - 9 Handbook of Suggestion for Teachers
 - 10 The Teachers guide Vol IV and
 - 11 Mrs Wisor's book on nutrition
-

FACULTY OF SCIENCE

B SC EXAMINATION—1949 & 1950

MATHEMATICS

There will be *three* papers—

I (a) *Algebra*—Inequalities Simple continued fractions Elementary theorems on convergence and divergence of series, Binomial theorem for any rational index, Exponential and logarithmic series Partial fractions and easy determinants

(b) *Analytical Geometry*—Straight line, circle parabola, ellipse hyperbola and the reduction of the general equation of the second degree to standard forms The above to be treated by rectangular and polar co ordinates only

(c) *Trigonometry*—Inverse trigonometrical functions De Moivre's theorem, summation of trigonometrical series, hyperbolic functions, expansion of trigonometrical functions

II (a) *Differential Calculus*—Limits, differentiation of a function of a single variable, successive differentiation, use of Taylor's and Maclaurin's theorems indeterminate forms, maxima and minima for a single variable, partial differentiation tangents, normals, a asymptotes double points, curvature envelope and simple curve tracing

(b) *Integral Calculus*—Standard forms methods of substitution Integration by parts and easy reduction formulae Rectification of plane curves quadrature surfaces and volumes of solids of revolution

(c) *Differential Equations*—Ordinary differential equations of first order and of first degree and linear equations with constant coefficients

III (a) *Statics*—General conditions of equilibrium of a particle and of a rigid body under the action of forces in one plane virtual work, friction, centre of gravity common catenary Hooke's Law

(b) *Dynamics of a Particle*—Velocity and acceleration Newton's Laws of motion, work and energy, rectilinear motion projectiles in vacuum circular and harmonic motions simple and cycloidal pendulums impact

(c) *Hydrostatics*—Fluid pressure pressure on immersed surfaces conditions of equilibrium of a floating body centre of pressure

PHYSICS

The examination will consist of *two papers* and a practical test. Candidates must obtain minimum pass mark in the practical examination as well as in the total of the theory papers.

The subject of the papers will be—

Paper I General Properties of Matter Sound and Heat

Paper II Light Electricity and Magnetism —

The following is the detailed syllabus —

General Properties of Matter — *Rotation of Rigid Bodies* —

Torque Moment of Inertia and its calculation about any axis in the case of bar disc cylinder and sphere Angular momentum and kinetic energy Simple harmonic oscillations of a rigid body Torsional and compound pendulums Experimental determination of moments of inertia

Universal Gravitation Attraction of sphere and spherical shell on external and internal point Gravitation constant and its determination Experiments of Cavendish Boys and Poynting Determination of g by Kater's pendulum Effect of latitude altitude and depth on the value of g

Elasticity Definitions of elastic constants and their interrelations Poisson's ratio Torsion of a cylinder Bending of a bar supported at the ends Experimental determination of elastic constants

Viscosity Determination of viscosity of a liquid by flow through a capillary tube

Surface Tension Angle of contact Rise of liquid in a capillary tube Pressure inside a spherical bubble or drop Jäger's method of measuring surface tension

Modern high vacuum pumps MacLeod gauge Elementary principles of the flight of an aeroplane Units dimensions and dimensional equations

Sound — Mathematical theory of the following with application to sound —

Equation of simple harmonic damped and forced vibrations Resonance Composition of simple harmonic vibrations Beats Lissajous figures Fourier's Theorem Equation of a wave Reflection and refraction of waves Interference of wave Stationary waves Vibrations of strings and air columns Calculation of velocity of longitudinal waves in a gas and transverse waves in a string Doppler's principle Measurement of frequency

of the velocity of Sound Musical sounds and noise Musical scales
 Temperament Common musical instruments—Harmonium Star,
 lin and Tabla
 Recording and reproduction of sound in gramophone and talkies Micro-
 ne and loudspeaker
 Elementary ideas of the acoustics of buildings (non mathematical)
 Heat—Mercury, gas and electrical thermometers and their corrections
 Standard Thermometers Measurement of high and low temperatures
 Expansion of solids, liquids and gases Calorimetry, ice steam and contin-
 uous flow calorimeters Specific heat of gases and their measurement
 Variation of adiabatic change and determination of γ Vapour pressure
 Its determination Triple point Refrigeration Theory of the porous
 plate experiment Liquification of gases Conduction Continuous flow
 heat through a bar Measurement of conductivity of solids Radiation
 Measurement of radiant heat Black body, Stefan's Law, Solar constant
 Temperature of the Sun Radiation pyrometers
 Kinetic theory of matter Derivation of the gas laws Ratio of speci-
 fics of perfect gases Vander Waals equation Critical constants
 Continuity of state
 The two laws of Thermodynamics Determination of 'J' Carnot cycle
 Efficiency of heat engines Steam and internal combustion engines
 Absolute scale of temperature Entropy Calculation of change of entropy
 Simple cases Maxwell's four thermodynamic relations and their impor-
 tant applications Specific heat of saturated vapours
 Light—Geometrical Combination of thin lenses, Cardinal points Spheri-
 cal aberration and methods of minimising it Chromatic aberration Achi-
 matic combination of lenses and prisms Direct vision spectroscopes
 Fraunhofer and Huyghens eye pieces The eye and defects of vision
 Spectrum and Spectrographs Elementary ideas of the ultra violet and
 the red portions of the spectrum Line and band spectra Balmer series
 Colour photography and tricolour Printing
 Physical Corpuscular and Wave theories of light Huyghens principle
 Explanation of reflection refraction and rectilinear propagation of light
 Interference Biprism Newton's rings and colour of thin films Michelson's
 interferometer Diffraction by a straight edge, thin wire rectangular
 aperture and circular disc or hole Resolving power of a lens and its
 application to telescope and microscope Plane diffraction grating Its
 resolving and resolving power of a prism Polarisation of light Theory
 of double refraction in uniaxial crystals Circularly and elliptically polar-
 ized light Rotation of plane of polarisation Half shade polarimeter

Electricity and Magnetism — Magnetic field and potential Potential and force due to a small magnet and a magnetic shell Action of one magnet on another Magnetic induction Susceptibility and permeability Hysteresis Para—dia—add ferro—magnetism Terrestrial Magnetism Determination of H and dip

Electric field and potential Calculation of potential and force in simple cases Gauss theorem and its applications Force on the surface of a charged conductor Tubes of force Energy of the electric field Capacity of spherical cylindrical and parallel plate condensers Dielectric constant Quadrant and attracted disc electrometers Electrostatic units and their relations to absolute and practical electromagnetic unit Primary secondary and standard cells Magnetic fields due to electric currents Force on electric currents in a magnetic field Different types of galvanometers voltmeters Ammeters and Wattmeters Ballistic galvanometer Kirchhoff's laws and their application to Wheatstone's net Carey Foster's bridge Measurement of high and low resistances Potentiometer Electrolysis Joule's law Thermo electricity Peltier and Thomson co-efficients and their relation to thermo electric power Piezo-electric effect Electro-magnetic induction Self and mutual inductance Growth and decay of currents Induction Coil Elementary theory of dynamos and motors Alternating currents Impedance and Reactance Power factor Choke Coil Transformer A C Ammeters and Voltmeters Charge and discharge of a condenser Electric oscillations Generation and detection of electromagnetic waves Three electrode valve Characteristic curves Simple receiving and transmitting sets Discharge of electricity through gases Cathode rays Positive ray Determination of e/m and charge of electrons Production of X rays Photo electric effect and the Principle of talking Pictures Elements of radio activity Isotopes General ideas of Proton Neutron Positron and atomic structure

Experiments in practical

- 1 Searle's method for Young's modulus and modulus of torsion
- 2 Young's modulus by bending of a bar
- 3 Determination of Moments of Inertia
- 4 Surface Tension by a Capillary tube
- 5 Modulus of Torsion by (a) Statical method
(b) Dynamical method
- 6 Co-efficient of viscosity of a liquid
- 7 Stomometer
- 8 Weight thermometer
- 9 Specific heat by method of cooling

- 10 'J' by mechanical method
- 11 Sextant,
- 12 „ by Spectrometer
- 13 by total reflection
- 14 Wave length of light by Newton's rings
- 15 Wave length of light by diffraction grating
- 16 Determination of H
- 17 Variation of magnetic field due to a circular current along the axis
- 18 Determination of specific resistances
- 19 Resistance of a galvanometer by Thomson's method
- 20 Resistance of a cell by Mance's method
- 21 Resistance of Accumulators
- 22 Carey Foster's Bridge
- 23 Resistance by Potentiometer
- 24 Calibration of voltmeter and Ammeter by Potentiometer
- 25 Measurement of thermo *e m f* by potentiometer
- 26 Ballistic constant of a galvanometer
- 27 Dip by earth inductor
- 28 Electro-chemical equivalent of copper
- 29 'J' by an electrical method
And any five of the following —
- 1 Surface Tension either by Jäger's method or by the detachment of a plate
- 2 Kundt's tube
- 3 Melde's experiment
- 4 Frequency of a fork by graphical method
- 5 " by Clement and Desormes's method
- 6 Conductivity of a metal
- 7 Focal length and nodal points of a combination of two lenses
- 8 " by Biprism or Lloyds mirror
- 9 Resolving power of a telescope
- 10 Photometry
- 11 Strength of Sugar solution by a polarimeter
- 12 Platinum resistance thermometer
- 13 Conversion of a galvanometer into an ammeter or voltmeter
- 14 Frequency of alternating current
- 15 Determination of impedance
- 16 Characteristic curve of a triode valve

CHEMISTRY

The examination in Chemistry will comprise *two* papers and a practical examination. Candidates must obtain minimum pass marks in the practical examination as well as in the total of the theory papers.

The course prescribed for the Intermediate Examination together with the following —

Physical and Inorganic—Atomic theory Avogadro's hypothesis and its application Determination of equivalent Specific heats of elements and compounds Isomorphism The periodic classification of elements Methods of determining atomic and molecular weights Kinetic theory of gases Law of mass action and its applications Ionic theory of Solutions Hydrolysis osmotic pressure vapour pressure influence of solutes on freezing and boiling points Law of electrolysis electrochemical equivalents determination of conductivity and transport numbers Acidity of acids and bases Hydrogenion concentration and theory of indicators Elements of catalysis colloids spectrum analysis thermochemistry atomic structure and its general relationship to periodic table atomic numbers radio activity and isotopes The relation of physical properties to chemical constitution Elements of Phase Rule dealing with systems of one component only

The occurrence preparation and properties of the following elements and their important compounds treated especially with regard to the periodic classification (Outlines of the main metallurgical processes of the metals indicated by an asterisk) Hydrogen Argon Helium Li *Na *K *Cu *Ag *Au Mg Ca Sr Ba Ra Zn Cd *Hg B *Al C Si Sn *Pb N P As Sb Bi O S Cr F Br Cl I Mn *Fe Co *Ni and *Pt Principal chemical manures Outline of the nitrogen cycle

Practical—Qualitative analysis of mixtures of substances containing no more than *four* of the following radical positive or negative by dry and wet method —

NH Na I Mg Ca Sr Ba Zn Mn Ni Co Al Cr Fe Cr Bi Hg Cd As Sb Sn Pb Ag CO₃ S SO₃ S₄ F₂ Cl Br I NO₂ NO₃ ClO₃ also borate acetate oxalate phosphate

Acidimetry and alkalimetry iodometry using thiosulphate arsenite permanganate dichromate and copper sulphate Titration of iron with potassium permanganate and dichromate standardization of permanganate by oxalic acid The volumetric determination of silver as chloride and as thiocyanate

Gravimetric estimation of Ba, Cu Ag, Pb, Zn, Fe, chloride and sulphate

Organic—The rise the development and the characteristics of organic chemistry Methods of purification and tests of purity of organic substances Methods of ultimate analysis qualitative and quantitative Determinations of empirical formula and molecular weights Structural formula Homology and Isomerism The occurrence, the Preparation, the properties and the structure of the following —

Acyclic hydrocarbons, (saturated up to pentane and (unsaturated the first members) The petroleum industry Halogen derivatives, mono, di, tri tetra, etc

Alcohols saturated (the first four) Industrial alcohol, (fermentation and elementary knowledge of enzymes yeast, bacteria and moulds glycol glycerol and their derivatives Manufacture of glycerol and its nitrates

Ethers Aldehydes and ketones,

Monobasic fatty acids saturated (up to butyric) Vinegar, soaps, candles, their manufactures, oils and fats Acid balms, anhydrides, amides and esters

Mercaptans

Amines, nitro paraffins Cyanogen and derivatives Urea

Organo metallic compounds of zinc and magnesium

Haloid acid, cyanacetic acids, amino acids, Hydroxy monobasic acids, glycolic and lactic Optical isomerism Ketonic acids (acetoacetic) Tautomerism

Dibasic acids (carbonic, oxalic, malonic and succinic) and derivatives Acids, malic, tartaric and citric

Glucose, fructose, sucrose, starch and cellulose (only a general view of occurrence, properties and reactions) Manufacture of sugar, paper and cellulose derivatives

Proteins, their occurrence and general characteristics in an elementary way

Cyclic aromatic hydrocarbons, benzene, toluene and naphthalene Coal gas and coal tar distillation, characteristics of aromatic compounds. The following derivatives of the above three hydrocarbons the halogen, the nitro, the amino derivatives and the sulphonates The Diazo reaction

Phenol, catechol resorcinol, pyrogallol, quinol and the naphthols, Benzyl alcohol, benzaldehyde, acetophenone, benzophenone, quiaone,

benzoic acid benzoyl chloride Salicylic and phthalic acids Pyridine

Practical

Systematic identification of the following organic compounds including (1) the determinations of their boiling or melting points (2) the detection of the elements contained (3) the application of tests characteristic of the groups contained and of the compounds themselves and (4) wherever possible the preparation of a solid derivative in a pure condition —

Benzene toluene naphthalene chloroform iodoform methanol ethanol Phenol resorcinol pyrogallol formaldehyde acetaldehyde chloral hydrate benzaldehyde acetone acid formic acetic oxalic succinic tartaric citric benzoic salicylic ethyl acetate ethyl benzoate glucose sucrose starch acetamide urea aniline tribromaniline acetanilide nitro benzene

Books recommended—

Caven Foundations of Chemical Theory
Walker Introduction to Physical Chemistry
Caven and Lander Systematic Inorganic Chemistry
Smith and Kendall Introduction to Inorganic Chemistry
Partington Text book of Inorganic Chemistry
Mellor and Parker Modern Inorganic Chemistry
Cohen Theoretical Organic Chemistry
Perkin and Hipping Organic Chemistry Parts I and II
Otwald Foundations of Analytical Chemistry
Caven Qualitative Analysis
Morrow Perkin Qualitative Analysis
Waters Introduction to Practical Organic Chemistry
Caven Quantitative Chemical Analysis (Part I)
Sarkar and Rakshit Organic Chemistry for the B.Sc. Part 3 Course

ZOOLOGY

The examination will comprise two papers and a practical examination. Candidates must obtain the minimum pass marks in the practical examination as well as in the total of the theory papers.

The following Syllabus is prescribed —

The general principles of Biology treated in an elementary manner, comprising the theory of evolution with the general notions of variation, heredity and adaptation

The elementary principles of the geological and geographical distribution of animals

The structure and the phenomena of the animal cell

Reproduction, sexual and asexual, Parthenogenesis,

Metamorphosis, Alternation of generations

The structure, habits, development and the economic importance (if any) of the non chordata as illustrated by—

Protozoa	Amdoba, Paramoecium, Euglena and Malarial parasite
Porifera	Sycon or any other sponge
Cœlenterata	Hydra, Obelia
Platyhelminthes	Liverfluke and Taenia
Annulata	Pheretima, Neries and Leech
Echinodermata	Starfish (general characters and external feature only)
Arthropoda	Prawn, (Locust if not available Cockroach) Anopheles, Housefly, and Scorpion Cimex (bed bug) habits, habitat and external features
Mollusca	A fresh water Mussel, and Pila or any other Pond Snail,

The principal characteristics, structure and habits of the Chordata as illustrated by—

Acrania—

Hemichorda	Balanoglossus
Urochorda	Herdmania or any other ascidian
Cephalochorda	Amphioxus
Cyclostomata	Petromyzon (external features only)

Craniala—

Pisces	Seeliodon or any other Elasmobranch and external features of a bony fish (skeleton excluded)
Amphibia	The Frog
Reptilia	Hemidactylus or any other lizard
Aves	Columba (The skeleton of Gallus may be substituted)
Mammalia	The general characters of the Prototheria and Metatheria, Lepus Squirrel or Rat Canis (skull only)

The outlines of the development of Ciona Amphioxus, frog, chick and rabbit Amnion and Allantois, Placentation

The elementary physiology of the various organs of the animal body as illustrated by the Frog and Rabbit

Paper I—shall comprise the non chordata the structure of the animal cell the subjects of Reproduction and Histology and the general principle of Biology

Paper II—The Chordata Vertebrate Embryology Physiology Geological and Geographical distribution

Practical Course

Candidates will be required to show a knowledge of simple microscopic technique and to dissect and describe the following animals—

Amoeba Paramoecium Sycon Hydra Obelia Pheretima Nereis
Leech Starfish (external features only) Prawn Cockroach
Scorpion Unio Pila Balanoglossus (external features only)
Herdmania Amphioxus (dissection omitted) Scoliodon or any
other Elasmobranch Frog Lizard Pigeon and Rabbit
Squirrel or Rat

Osteology of dog fish frog lizard fowl rabbit dog's skull and Echidna (limbs and limb girdles only)

Note books containing a complete record of laboratory work must be produced at the practical examination

Books recommended—

Parker and Huxwell Text book of Zoology Vols I and II (Macmillan).
Wiedersheim and Parker Comparative Anatomy of Vertebrates
Bourne Comparative Anatomy of Animals Vols I and II
Parker and Bhatia Text book of Zoology for Indian Students
Dendy Outlines of Evolutionary Biology
Marshall and Huxley Practical Zoology (John Murray)
Thomson Outlines of Zoology
Kingley Comparative Anatomy of Vertebrates
K. N. Bahl Pheretima
E. M. Thillayampalam Scoliodon
Baini Prasad Pila
Boisradle and Lott Invertebrate.
S. M. Das Herdmania
Br. Mus. Nat. Hist. Economic Series No. 5—The Bed Bug

BOTANY

The examination will comprise *two* papers and *Practical* examination. Candidates must obtain minimum pass mark in the practical examination as well as pass in the total of the theory papers.

The following syllabus is prescribed —

1 The anatomy including histology of the vegetative and reproductive organs of Phanerogams and Cryptogams treated from the comparative and functional standpoint

A general knowledge of the plant cell and plant tissues. The cell contents and their micro chemical reactions,

2 The morphology, Physiology and life histories of

Thallophyta—

- (a) Bacteria
- (b) Algæ—*Volvox*, *Ulothrix*, *Pleurococcus*, *Oedogonium*, *Laucheria*, *Chara*, *Fucus*, *Polysiphonia*, *Oscillatoria* and *Nostoc*
- (c) Fungi—*Rhizopus*, *Cystopus*, *Saccharomyces*, *Marchella*, *Eurotium*, *Ustilago*, *Buccinia* and *Agaricus*

Bryophyta—

- (a) Hepaticæ—*Riccia*, *Marchantia* and *Anthoceros*
- (b) Musci—*Funaria* or any other moss

Pteridophyta—

- (a) Filicinae—*Equisetum*, *Aspidium* or other fern and *Marsilea*
- (b) Lycopodineæ—*Selaginella*

Spermatophyta—

- (a) Gymnasperms—*Cycas* and *Pinus*
- (b) Angiosperms—A detailed knowledge of the structure and life history of a typical flowering plant and the characteristic features and economic importance of the following —

Families —

Ranunculaceæ, Papaveraceæ, Cruciferae, Caprifoliaceæ, Violaceæ, Caryophyllaceæ, Malvaceæ, Rutaceæ, Leguminosæ, Rosaceæ, Myrtaceæ, Cucurbitaceæ, Umbelliferae, Rubiaceæ, Compositæ, Apocynaceæ, Asclepiadaceæ, Convolvulaceæ, Solanaceæ, Acanthaceæ, Labiata, Euphorbiaceæ, Musaceæ, Liliaceæ, Palmae, and Gramineæ

3 Vegetable Physiology—

- (a) An elementary knowledge of plant anatomy from the physiological stand point
- (b) Nutrition—Chemical constituents of the plant the essential constituents of plant food the absorption of water and dissolved substances water conduction transpiration the assimilation of carbon and nitrogen the utilization and transference of the products of assimilation and reserve materials special processes of nutrition
- (c) Respiration—General facts
- (d) Growth—General facts
- (e) Movements—Protoplasmic movements imbibition movements heliotropism geotropism contact stimuli and their effects movements of variation
- (f) Reproduction—Vegetative reproduction sexual reproduction including double fertilization cross and self pollination dispersal of fruits and seeds germination

4 An elementary knowledge of variation heredity evolution and plant breeding

5 Elementary plant ecology

Paper I—Shall comprise the Morphology and life histories of Cryptogams and Gymnosperms

Paper II—shall comprise the Morphology Physiology and life histories of Angiosperms General Plant Physiology General Biology and Ecology

Practical Course

The dissection of the plants and parts of plants The preparation staining and study of microscopical sections of plants and the principal varieties of plants tissues The uses of stains and other reagent and the microchemical reaction of protoplasm starch and cellulose with its derivatives

A practical study of the typical plants enumerated under section 2 the referring of plants and parts of plants to their appropriate position in the given schedule of classification

The description of plants and parts of plants in technical language
Simple experiments in Plant Physiology

Note-Books containing a complete record of laboratory work must be produced at the *Practical* examination

Books recommended—

- Scott Structural Botany, Vols I and II
 - Strasburger Text-book of Botany
 - Strasger and Hill House Practical Botany
 - Coulter, Barnes and Cowels Text-book of Botany
 - Wills Flowering Plants and Ferns
 - Cavers Practical Botany
 - Palladin Plant Physiology
 - Holman and Robbins Text book of General Botany
 - Gager General Botany
 - S Ranjan Plant Physiology
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GEOLOGY

There will be two papers, each of three hours duration and each carrying 50 marks. There will also be a practical examination carrying 50 marks. 20 per cent of the total marks in the Practical shall be assigned to the record of the candidate during the two sessions and the report of the field work done by him.

Paper I—Dynamical and Structural Geology, Palaeontology, and Historical Geology

Paper II — Crystallography Mineralogy, Petrology and Economic Geology

Dynamical Geology or Physical Geology

The aims, methods, and application of Geology

Elementary ideas about the origin ago and the interior of the earth
Nature of the earth's crust. Origin of continents and oceans

Weathering of the earth's crust by rain, wind, heat and cold, frost, underground water, rivers, glaciers and the sea

Transpiration by gravity, rivers, glaciers and wind

Deposition of the detritus. Terrestrial, palustrine, fluvial, lacustrine and marine deposits

Volcanoes—nature and origin, the phenomenon and its effects, connection with volcanoes

Evolution of surface—features by terrestrial agencies and river erosion
 Formation of valley systems The effect of glaciation and wind action on topography

Physiographic features of India

Structural Geology

Stratification Structures of sedimentary and igneous rocks

Joints Dip strike and out crop Folds Faults and their effects on outcrops Unconformity and its significance Contour maps The nature of outcrops in contour maps Reading of simple geological maps and drawing of sections

Palaeontology

Conditions for the entombment of organic remains Fossils their character and modes of preservation The value of fossils as indices of age and climate Morphology and geological distribution of the following groups of fossils —

Actinozoa Graptolitoidea Crinoidea echinoidea brachiopoda Lamellibranchiata Gastropoda cephalopoda and trilobita

An elementary knowledge of the nature and distribution of vertebrate and plant fossils

Historical Geology

Principles of stratigraphy Lithological and chronological subdivisions of the geological record The leading features and characteristic fossils of the different geological periods The rock formations of India and Burma treated in a concise manner

Crystallography

Laws of crystallography The six systems of crystallography Important classes of symmetry Weiss and Miller systems of notations The contact goniometer Twinning

Mineralogy

Physical and chemical properties of minerals

The petrological microscope

Optical character of minerals under the microscope in ordinary and polarized light

Study of about 40 of the more important rock forming minerals with regard to their chemical composition alterations physical properties

Crystallographical and microscopic characters occurrence and commercial uses, if any

Study of about 80 of the more common metallic and nonmetallic minerals of economic importance with regard to their chemical composition distinctive physical properties, blowpipe test, occurrence, and economic uses

Petrology

Igneous and sedimentary rocks—their morphology, texture modes of origin and classification

Metamorphism Important types of metamorphic rocks

Study of about 40 common rock types

Economic Geology

Modes of occurrence, origin and classification of ore deposits Secondary enrichment The Chief Metallic and non metallic of economic importance found in India

Coal and Petroleum Water supply Building stones

General principles of prospecting and development Economic considerations on which the value of an ore deposit depends

Practical Work

Reading of geological models showing physiographical and structural features

Determination of density, hardness and fusibility of minerals

Reading and making drawings of crystals of common minerals

Examination of important rock forming minerals in hand specimens and under the microscope

Microscopic and megascopic examination of a representative collection of rock types and sections

The study and drawing of specimens from a representative collection of fossils

Blow pipe test and hand recognition of economic minerals Easy exercises on the outcrop of beds Reading geological maps and drawing sections across simple geological structure

Book recommended—

W B Scott *An Introduction to Geology*, Vol I [Macmillan & Co]

Platt and Chalknor *Simple Geological Structures* [Thomas Murby & Co]

- H Woolls Palaeontology (Cambridge University Press)
 D N Wadia Geology of India for Students (Macmillan & Co.)
 N L Sharma Mineralogy Petrology and economic Geology (Ind Soc of Engineers Calcutta)
 N L Sharma Notes on geological maps and section (Calcutta Geographical Society)
 F Rutley Elements of Mineralogy Revised by H H Read (Thomas Murby & Co.)
 H G Smith Minerals and the Microscope (Thomas Murby & Co.)
 G W Tyrell The principles of petrology (Methuen & Co.)
 J W Gregory The Elements of Economic Geology (Methuen & Co.)
 M S Krishnan Introduction to the Geology of India

MILITARY SCIENCE

There will be two papers of 50 marks each and a practical test of 50 marks

Paper I — Military Organisation administration and tactics

This will include—

- (1) Infantry Battalion Organisation
- (2) Infantry Weapons and their characteristics
- (3) Organisation of the Navy Army and Air forces in India
- (4) Reconnaissance and Protection
- (5) Action against Tanks
- (6) Defence against Air Attack
- (7) Protection against Gas
- (8) The duties of a Platoon Commander in Attack and Defence
- (9) Verbal Order Reports and Messages
- (10) Elementary Tactics

Reference books—

- 1 Military Training Pamphlet 23 Part I
- 2 Infantry Section Leading Pamphlet 14 1942
- 3 S A T Vol I Pamphlet No 6
- 4 Hostile and Friendly Air Craft 1942
- 5 Military Training Pamphlet 33 Field Craft Elementary Tactics
- 6 Military training Pamphlet 17 Defence against Airborne Troops 1942
- 7 Military Training Pamphlet GAS TRAINING 1942
- 8 M T P No 16 (India) Platoon Leading in Frontier Warfare

9 M T P No 30 Field Engineering All Arms Part V Protective Works

10 Handling of Men

11 The Officer and the Fighting and Efficiency

12 Army in India Training Memoranda, periodically issued by the G H Q

14 KIRBY and KENNEDY Tactical Schemes with solutions Series I and II

15 PENDELBURY Elementary Tactics

Paper II—Military Law (India) Map Reading Military Hygiene and General principles of War in the Light of Mesopotamian Campaign by Wavel

Reference Books—

1 Manual of India Military Law (Government Publication)

2 O' Donnell Manual of Indian Military Law

3 I T F Act and I T F Regulations

4 Hand-book of Military Hygiene 1941

5 Mesopotamian Campaign 1916—1918 by Wavel

Practical Test The candidate will be required to pass a practical test in Map Reading, Setting Map, Finding position on the Map The use of of Prismatic Compass and Service Protractor, (b) T E W T or if suitable ground be not available by means of a Sand Table Exercise in which the Candidate will act as a Platoon Commander (c) First aid to the Injured

ENGLISH

There will be two papers —

Paper I—Essay and Unseen

(1) An essay designed to test the powers of the student to write clearly and correctly on (a) subject with which he may be expected to be acquainted and (2) an unseen passage from a modern book, magazine, newspaper, designed to test the candidate's knowledge and intelligent appreciation of present day topics and his ability to write a clear *precis* together with exercises on idiom

M Sc EXAMINATION
MATHEMATICS
PREVIOUS

Paper I—(i) *Algebra* —Convergence of infinite series and of infinite products, the expansion of sine and cosine in an infinite product

Books recommended—

Hobson Plane Trigonometry
Bernard and Child Higher Algebra

- (ii) *Theory of Equations* —General properties of equations relation between roots and coefficients, symmetric functions of the roots, transformation of equations, algebraic solution of the cubics and biquadratics sums of powers of roots Sturm's theorem, approximate solutions of numerical equations determinants
- (iii) *Vector Analysis*—Fundamental notions, addition subtraction and multiplication of Vectors, simple geometrical and mechanical applications

Book recommended—

Weatherburn Elementary Vector Analysis

Paper II—(i) *Differential Calculus*

Taylor's theorem, maxima and minima of functions of two or more variables, definition of continuity and differentiability change of variables, Jacobians

- (ii) *Integral Calculus* —Improper integrals and simple tests for convergence of integrals definite integrals including Beta and Gamma functions multiple integrals volumes and surfaces of solids, use of Fourier's series
- (iii) *Differential Equations*—Ordinary equations of the first order, order general linear equations with constant coefficients linear equations of the second order including transformations to standard forms & variation of parameters, homogeneous equations and exact equation, simultaneous differential equations with constant coefficients, total differential equations, partial differential equations of the first order

Paper III—(i) *Analytical Geometry of three dimensions*

Plane, straight line, reduction of the general quadratic equation to standard forms properties of a quadratic surface referred to its principal axes

(ii) *Analytical Geometry of two dimensions*

Homogeneous co ordinate tangential co ordinates families of conics invariants and covariants

Paper IV —(i) *Analytical Statics* —Strings in two dimensions centres of gravity virtual work stability systems of forces in two or three dimensions

(ii) *Dynamics of a particle in two dimensions* —

Central forces motion in a resisting medium constrained motion hodographs and revolving curves

Final

The examination shall consist of four papers as follows —

Compulsory

Paper I —(i) *Theory of Aggregates* —Cantor's and Dedekind's theory of irrational numbers arithmetical theory of limits linear sets limit points and derivatives of point sets descriptive terminology of point sets enumerable aggregates power and content of an aggregate definition of measure

(ii) *Theory of Function of a real Variable* —Continuity and discontinuity of functions of a single variable properties of continuous functions Maxima and minima of a continuous function derivatives of functions Mean value theorems Riemann's integration Fundamental theorems in integral calculus

(iii) *Theory of Function of a Complex variable* —Conformal representation of one plane on another integration of a regular function Cauchy's theorem residues development in power series Taylor and Maclaurin's series and Laurent's series

(iv) Uniform convergence of series products and integrals including the continuity of sum function and term by term differentiation and integration of series

Paper II (i) *Statics* —Attractions and potentials of rods discs and spheres Gauss's Laplace's and Poisson's theorem

(ii) *Rigid Dynamics in two and three dimensions* —Moments and products of Inertia Principle axes Moment of Inertia and definition of ellipsoid of gyration D'Alembert's principle Motion about a fixed axis centre of percussion Motion in two dimensions Principles of momentum and energy Lagrange's equations in generalised co ordinates Euler's Dynamical and Geometrical equations

Papers III and IV—Any two of the following —

- (i) Spherical Harmonics—Linear partial differential equation with constant co-efficients, Monge's methods, solution in series of Legendre's, Bessel's equations and hypergeometric series, solutions of Laplace's equation in spherical cylindrical and ellipsoidal co ordinates, expansion of a function to surface harmonics, application to potential problems

Books recommended—

MacRobert Spherical Harmonics

Ganesh Prasad Spherical Harmonics, Part I

- (ii)—Hydromechanics

Hydrostatics—Laws of fluid pressure general conditions of equilibrium in a fluid, uniformly rotating liquid equilibrium of floating bodies, including metacentric formulæ, equilibrium of gaseous liquids (excluding capillarity and oscillation of floating bodies)

Hydrodynamics—Lagrangian and Eulerian methods continuity, bounding surface condition, velocity potential and current function, sources and sinks, motion of circular and the elliptic cylinders in two dimensions, motion of a sphere in liquid simple waves, vibrations of a string and of air in tubes

Book recommended—

Besant and Ramsay Hydro mechanics, Parts I and II

- (iii)—Elliptic Function and Vector Analysis

Elliptic Functions—General properties of elliptic function Weierstrassian and Jacobian elliptic functions, including the Sigma and Zeta functions elliptic integrals, simple geometric and mechanical applications

Books recommended—

Goursat Mathematical Analysis

Hancock Elliptic Functions

Vector Analysis—The Scalar and Vector products of Vectors gradient of a scalar function and the curl and divergence of Vector functions The line, space and volume integrals of Vector functions with the standard transformation formulæ The linear Vector function Simple applications to differential geometry, attraction and potential

Book recommended—

Weatherburn Advanced Vector Analysis

- (iv)—Spherical Trigonometry and Spherical Astronomy

Spherical Trigonometry, including the general properties of Spherical triangles

Spherical Astronomy—Fundamental Instruments Celestial sphere
 Atmospheric refraction Precession and Nutation Time
 Ecliptic The Equation of Time Aberration Parallax
 Eclipses Rising of the Sun and the Moon Twilight
 Determination of position on earth Planetary Phenomena

Books recommended—

Smart Astronomy

Ball Spherical Astronomy

Todhunter and Leathem Spherical Trigonometry

(v)—Solid and Differential Geometry

Systems of quadrics surfaces and curves in space including the associated developables and Frenet's formulæ fundamental forms Gauss's characteristic equation and the Mainardi Codazzi relations lines of curvature conjugate lines asymptotic lines geodesics and geodesic curvature

Books recommended—

Bell Solid Geometry

Forsyth Differential Geometry (First three chapters)

Eisenhart Differential Geometry

(vi)—Complex Variable

1 Meromorphic functions Pouchet Hurwitz Jensen Carleman's and Littlewood's Theorems Poisson Jensen Formula

2 Analytic continuation simple properties of Gamma and Zeta functions Hadamard's multiplication Theorem

3 The maximum modulus Theorem Vitali's and Montel's Theorems Hadamard's three circles Theorem Caratheodory's inequality the theorems of Phragmen and Lindelof

4 Conformal representation and simple functions

5 Power series with a finite radius of convergence Riesz Fatou Theorem Over convergence Hadamard's gap Theorems Hardy Littlewood's Theorem Abel's Theorem and its converse Partial Sums of Power series

6 Integral functions Weierstrass's and Hadamard's Theorems Sterling's Theorem Theorems of Laguerre Borel's Schottky's Landau's and Picard's Theorems

7 Dirichlet's Series Simple properties of ordinary Dirichlet's Series

Book recommended—

E C Titchmarsh *The Theory of Functions* (O U P), 1932—
Chapters III IX

(iii)—*Mathematical Theory of Statistics*

General nature and scope of Statistical methods Classification of Statistical data by categories and measurements Frequency Distribution
Measures of Central tendency Mean Median and Mode
Measures of Dispersion—Standard Deviation
Elements of the theory of probability Addition and Multiplication
Theorems Mathematical Expectation
Normal Binomial and Poisson Distributions Moments
Elementary ideas of skew distributions
General ideas of association and correlation Coefficient of correlation
Fitting of straight and curved regression lines

Elements of Sampling Theory Exact distribution of \bar{x} , t and χ^2 —statistics in Samples drawn from a normal population with application to the problem of the significance of the difference of the means based on large and small samples

PHYSICS

(For the Previous and Final Examinations)

The following is the detailed syllabus (in addition to what is included in the B Se course) —

Paper I—*Properties of Matter and Heat*

Gravitation Theory of compound pendulums Kepler's Laws and
Gravitation constant Mass and density of earth

Elasticity Moduli and their inter relations Bending of beams
Elastic curves and stability of pillars Spiral springs Compressibility
and tensile strength of liquids

Surface Tension General theory Waves and ripples Spherical and
cylindrical films Drops Vapour pressure over curved surfaces theory

Viscosity of liquids and gases Flow through capillary tubes Lubrication

Crystals Symmetry and classification of crystals Arrangement of atoms in lattices

Kinetic Theory Maxwell's law of distribution of velocities Equipartition of energy Mean free path Viscosity Conduction Diffusion
Specific heat Brownian motion Molecular streaming Effusion and
vapour pressure of metal Absolute manometer Modern vacuum pumps

and gauges Molecular dimensions

Thermodynamics Laws of Heat engines steam and internal combustion engines Entropy Applications of thermodynamics Production of very low temperatures Nernst Heat Theorem

Radiation The Laws of Stefan Wien Rayleigh Jeans and Planck Radiation pyrometry Temperature of the sun and the stars

Quantum Theory of Specific heats

Statistics Statistics and mechanics and entropy General outline of Bose Einstein and Fermi Dirac Statistics

Paper II — *Sound and Light*

Sound Fourier's Theorem and its application to plucked struck and bowed strings Noise and sound level and their measurement Pressure of waves Acoustics of buildings Supersonics Acoustic impedance and filters Absorption Coefficients Microphones Loud speakers Recording and reproducing of sound Photographs of sound waves

Light Geometrical—Fermat's Law of ray propagation General Theory of image formation Cardinal points Defects of images Aplanatic points

Physical—Theory of Fresnel and Fraunhofer diffraction Concave and echelon gratings Resolving and dispersive powers Diffraction of X rays by crystals and X ray spectrographs Michelson Fabry Perot and other interferometers Lummer Gehrcke plate Stellar interferometer Theory of double refraction Interference of polarised light Rayleigh and Raman Scattering Propagation of wavegroups and nature of white light Electromagnetic Theory of Light

Optical Instruments and their performance

Objectives and oculars Photographic lenses Prism and Grating spectrographs for the visible infra red and ultra violet Photometers Microphotometers and Spectrophotometers

Paper III — *Magnetism and Electricity*

Magnetism Potential and field due to a small magnet a magnetic shell and a uniformly magnetised sphere Magnetic measurements Kew Magnetometer Production and measurement of strong and weak magnetic field Hysteresis Elementary theories of magnetism

Electrostatics Gauss's Theorem and its applications Condensers Measurement of dielectric constant Energy of electrostatic field Boundary condition Electrometer

Current Electricity Various types of galvanometers Measurement of current potential and resistance Absolute measurement of the units Elect

electrostatic and electromagnetic Units and their ratios Electro magnetic induction Measurement of inductance and capacity

Alternating Currents—Single and three phase Dynamos, alternators, motors and transformers Rectifiers A C measuring instrument

Electromagnetic waves Theory of Electromagnetic fields Maxwell's equations Propagation of waves Theory of their reflection refraction dispersion and absorption Production of waves and measurement of frequency Elements of wireless telegraphy, telephony and television

Paper IV —*Electron and Nuclear Physics*

Electrical discharge through gases

Ionisation and ionisation currents Ionisation and resonance potentials,

Cathode rays, Charge mass and e/m of electrons Photo electrons and

Thermions Electron optics and electron microscope Radiation from accelerated electrons Production and properties of λ rays Theory of magnetism

Positive Rays Mass spectrographs and Isotopes The periodic table

Radio activity α , β and γ rays Radioactive transformations Wilson

chamber and Geiger counters Production of high energy charged particles Cyclotron Artificial disintegration, Induced radioactivity Nuclear reactions Structure of the Nucleus

Cosmic rays, positron and meson

Paper V —*Modern Physics*

1 Vector algebra and simple application of calculus to vector quantities

2 Theory of Relativity—Optical and Electrical Experiments on the relative motion of ether and matter Fresnel's convection coefficient Michelson and Morley's Experiments Postulates of the special theory of relativity Lorentz Einstein Transformations Fitzgerald contraction and time dilatation Addition of velocities Variation of mass and inertia of energy Very elementary ideas of the general theory of relativity Experimental verifications

3 General outlines of the theory of Atomic Structure and Spectral Lines,—

Bohr's theory of Hydrogen spectrum Calculation of the energy of stationary states Method of excitation of the Atom Emission and absorption spectra Fine Structure Spectra of Alkali and Alkaline earths and Multiplicity of spectral lines Spectra of ionised atoms Normal and complex Zeeman effect Paschen and

Beck effect Stark effect Pauli's Principle and the periodic table
X ray spectra Molecular spectra Zeeman effect Correspondence
Theorem and Selection principles

*Note—Detailed study of the above is included in paper VI (b)
Spectroscopy and not in this paper*

4 Wave Mechanic Hamilton's principle of Least Action Hamilton
Jacobi equation Matter waves de Broglie wave length Dual nature of
light and matter Electron diffraction Schrodinger's equation Applica-
tion to linear oscillator rotator and Hydrogen atom Theory of observ-
able Principle of Uncertainty

Paper VI—One of the following special subjects —

(a) Meteorology

Thermodynamic properties of gases determination of thermal heights
from pressure and temperatures at different levels Isothermal convec-
tive and radiative equilibrium of the stratosphere Comparison with actual
conditions existing in different parts of the world

Buys Ballot's Law cyclonic and anti cyclonic motion influence of
change of temperature gradient with height on change of wind weight

Turbulence—Taylor's eddy conductivity and eddy viscosity Wind in
the lower layers of the atmosphere

Thermodynamics of moist air Neufuss's diagram and T- ϕ diagram
Radiation—solar and terrestrial

General ideas about waves and disturbance in superposed layers of air
with horizontal and inclined surface of separation

Meteorological Optics Blue of the sky Twilight colours Halos
Coronas Rainbows

General circulation of the atmosphere trades and antitrades mon-
soons, cyclones of the subtropical and tropical seas

(b) Spectroscopy

Different methods of excitation for atomic and molecular spectra

Theory and use of different varieties of spectroscopes and spectro-
graphs with prisms or gratings—plane or concave Dispersing and resolving
powers Astigmatism Ghosts

Theory and use of Michelson interferometer Fabry and Perot interfero-
meter Lummer-Gehrcke Plate and Echelle Their resolving power
Absolute measurement of wavelengths

The infra-red region Apparatus and instruments Infra red interfero-
meters

The ultra violet region Quartz and grating spectrographs Schumann, Lamann and Millikan regions

The λ ray region Single and double crystal and grating spectrographs

Photography of spectra, Sensitisation of plates for red infra red and Scheumann regions λ ray plate

Spectro photometers Recording and non recording microphotometer Absolute measurement of intensity of spectral lines

Spectrum analysis—qualitative and quantitative Raintime long and short lines Standard electrodes and powders

Methods of studying absorption spectra

Theory of Atomic Spectra

Bohr Sommerfield theory of one electron atoms Circular and elliptic orbits Nuclear motion Relativity correction and fine structure Electron spin Bohr magneton Spectra of ionised atoms

Spectra of the elements of Groups I and II Screening Multiplet structure and I s coupling Selection rules

Spectral terms and their nomenclature Primed terms and double excitation

Spectral of Helium Complex spectra 11 coupling

λ ray spectra K L M series Screening and relativity doublets Absorption edges Continuous spectra

Zeeman effect normal and complex Lande's factor, Paschen Bach effect Stark effect Hyperfine structure Methods of determining spin and magnetic moment of nuclei Einstein's A and B coefficients Intensities of lines and of components of multiplet

Correspondence principle Rules of selection and polarisation deduced for various quantum numbers

Vector model of the atom Pauli's principle Illustration of its use

Theory of Molecular Spectra

Rotation—rotation, vibration and electronic spectra.

Selection rules Isotope effect Band systems Rotational structure of electronic bands Heat of dissociation of diatomic molecules intensity relation in band spectra

Raman spectra Experimental technique for liquids, gases and solids and for different temperatures Measurement of depolarisation Relation to molecular spectra Vibrational and rotational Raman lines Selection rules Electronic transitions Polarizability theory of diatomic molecules

Beck effect Stark effect Pauli's Principle and the periodic table
X ray spectra Molecular spectra Compton effect Correspondence
Theorem and Selection principles

*Note — Detailed study of the above is included in paper VI (b)
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Meteorological Optics Blue of the sky Twilight colors Halos
Coronas Rainbows

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(b) *Spectroscopy*

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Theory and use of different varieties of spectroscopes and spectro-
graphs with prisms or gratings—plane or concave Dispersing and resolving
powers Astigmatism Ghosts

Theory and use of Michelson interferometer Fabry and Perot interfero-
meter Lummer-Gehrcke plate and Echelon Their resolving powers
Absolute measurement of wavelengths

The infra-red region Apparatus and instruments Infra red interfero-
meter Focal relation Residual rays

The ultra violet region Quartz and grating spectrographs Schumann, Lamann and Milikan regions

The λ ray region Single and double crystal and grating spectrographs

Photography of spectra, Sensitisation of plates for red infra red and Scheumann regions λ ray plate

Spectrophotometers Recording and non recording microphotometer Absolute measurement of intensity of spectral lines

Spectrum analysis—qualitative and quantitative Rastall time long and short lines Standard electrodes and powders

Methods of studying absorption spectra

Theory of Atomic Spectra

Bohr Sommerfeld theory of one electron atoms Circular and elliptic orbits Nuclear motion Relativity correction and fine structure Electron spin Bohr magneton Spectra of ionised atoms

Spectra of the elements of Groups I and II Screening Multiplet structure and L s coupling Selection rules

Spectral terms and their nomenclature Primed terms and double excitation

Spectral of Helium Complex spectra 11 coupling

λ ray spectra K L M series Screening and relativity doublets Absorption edges Continuous spectra

Zeeman effect normal and complex Lande's factor, Paschen Bach effect Stark effect Hyperfine structure Methods of determining spin and magnetic moment of nuclei Einstein's A and B coefficients Intensities of lines and of components of multiplet

Correspondence principle Rules of selection and polarisation deduced for various quantum numbers

Vector model of the atom Pauli's principle Illustration of its use

Theory of Molecular Spectra

Rotation—rotation, vibration and electronic spectra

Selection rules Isotope effect Band systems Rotational structure of electronic bands Heat of dissociation of diatomic molecules intensity relation in band spectra

Raman spectra Experimental technique for liquids gases and solids and for different temperatures Measurement of depolarisation Relation to molecular spectra Vibrational and rotational Raman lines Selection rules Electronic transitions Polarizability theory of diatomic molecules

Theory of polyatomic molecules Raman effect due to lattice oscillations
Relation to molecular symmetry and strength of chemical bonds

(d) X Rays

Phenomena in vacuum tubes generation of X rays high voltage generator X ray bulbs different methods of setting up an X ray establishment

Study of properties of X ray secondary X rays characteristic X ray absorption coefficient of characteristic X rays ionisation by X rays scattering of X rays

Laue's discovery of the diffraction of X rays by crystals Bragg's method of reflection crystal analysis by Bragg's method of reflection crystal analysis by the Debye-Scherrer method and the Laue method X ray spectrometers Moseley's work on the measurement of wave lengths of characteristic X rays Siegbahn's work X ray absorption spectra

(d) Wireless Telegraphy and Telephony

Series and parallel resonance Sharpness of resonance Simple theory of transmission of waves on lines Theory of simple electric filters Simple coupled circuits and impedance transformation

Properties of coils and condensers Resistance of coils at radio frequencies Skin effect Properties of iron core coil Their A.C. inductance when D.C. is superimposed Incremental permeability Electrolytic and other types of condensers

Physics of the thermionic tubes Various types of tubes their contents and uses Audio frequency amplifiers Resistance coupled transformer coupled and impedance coupled amplifiers Class A and B and push-pull amplifier Direct coupled and feedback amplifiers Input impedance of triode Lower amplifiers—classes A, B and C

Radio frequency oscillators and amplifiers untuned and tuned amplifiers for reception Neutralization circuits and the adjustments Crystal oscillators and other frequency stabilisation devices Ultra high frequency oscillators the magnetron and the Barkhausen-Kurtz types

Modulation Methods of modulation amplitude and frequency modulations

Vacuum Tube Detectors Plate grid power heterodyne regenerative and super regenerative detectors Vacuum tube voltmeters Modern superheterodyne receivers and their performance Automatic volume control Tone control

Antenna Theory of radiation from an antenna, Distribution of field around a vertical antenna Directional antenna, loop antenna and radio direction finders Antenna arrays Theory of ionosphere, skip distance, echoes, fading

Power supplies Metal rectifiers and vacuum tube rectifiers Filter systems

Microphones and Loud Speakers and their simple theory

Elementary ideas about Television

(Practical)

Previous

- 1 Young's Modulus of a bar by the method of interference fringes
- 2 Surface Tension by method of ripples
- 3 Variation of Surface Tension with temperature
- 4 Viscosity of liquids and air by rotating cylinder method
- 5 Stroboscopic determination of frequency
- 6 Adjustment and calibration of Spectrometer
- 7 Constant deviation spectrometer
- 8 Biquartz
- 9 Michelson's Interferometer
- 10 Fabry Perot Interferometer
- 11 Refractive index of a gas
- 12 Elliptically and circularly polarised light
- 13 Verification of Fresnel's formulae of reflection and refraction
- 14 Standardisation of ballistic galvanometer
- 15 Self and Mutual induction— (i) Ballistic Galvanometer method, (2) A C method
- 16 Capacity of condensers
 - (i) De Sauty's method
 - (ii) Absolute method
 - (iii) A C Method
- 17 Hysteresis
- 18 Potentiometer
 - (i) Calibration of ammeter
 - (ii) Calibration of Voltmeter
 - (iii) Measurement of low resistance
- 19 Carey Foster's Bridge
- 20 Kelvin Bridge
- 21 Transformer
- 22 Magnetic Susceptibility of liquids

23 Wireles receiving circuit

Final

- 1 Electrometer and Ionisation current.
- 2 Cathode ray Oscillograph
- 3 e/m by a diode
- 4 e/m by Rus h method
- 5 Charge of an electron
- 6 Planck's constant by Photo cell
- 7 Use of Geiger muller counter
- 8 X ray tracks by Wilson Chamber
- 9 Laue pattern of a crystal
- 10 Joly's Steam calorimeter
- 11 Conductivity of bad conductors
- 12 Platinum Thermometer
- 13 Thermo electric Thermometer
- 14 Mechanical Equivalent heat
- 15 Stefan's Constant

And experim nts of one of the following groups corresponding to the special subject chosen by the candidate —

VI (a) *Meteorology*

- 1 Different types of clouds General physical processes involved in their formation Nephoscopes and their use for measuring wind direction and velocity
- 2 Practical knowledge of self recording instruments of a first class meteorological observatory
- 3 Pilot balloons following and working out single theodolite double theodolite and flag methods
- 4 Sounding balloons meteorographs Calibration working out of records and interpretation.

(b) *Spectroscopy*

- 1 Arc and Spark spectra
- 2 Quartz spectrograph,
- 3 Concave Grating
- 4 Determination of Wave length—Hartmann Formula
- 5 Lummer Gehrcke Plate
- 6 Zeeman effect
- 7 Spectrophotometer
- 8 X ray Spectrograph

• (c) *X rays*

- 1 Practice with X-ray tubes
- 2 Bragg's reflection method of X-ray analysis — (The wave length crystal constants and determining the structure of crystals)
- 3 Practice with the X ray Spectrometer wave length of characteristic lines
- 4 Absorption by X-rays
- 5 Ionisation by X-rays

(d) *Wireless Telegraphy and Telephony*

- 1 High frequency measurement of capacity, self and mutual inductance, resistance
- 2 Measurement of wave length
- 3 Characteristic curves of triode valves
- 4 Practice with different detectors
- 5 Crystal detectors and valve detectors
- 6 Practice with transmitting sets
- 7 Practice with amplifying sets

CHEMISTRY PREVIOUS

Note—Candidates will be required to pass in the written as well as in the practical examination separately

There will be three papers as follows —

Paper I—Inorganic

Paper II—Organic

Paper III—Physical

In each paper questions will be set on History

Inorganic —The following syllabus is meant to indicate the general scope of the examination

A fuller study of the B Sc syllabus together with a systematic knowledge of the undermentioned less common elements and their compounds Outlines of the main metallurgical processes treated non technically, in the case of the elements italicised —

Ne, Kr Xe Nt Rb Cs Be Ti Ce Tl Th V Se Te Mo W
U Pd

A general study of —The atomic structure radio activity electronic theory of valency allotropy isomorphism catalysis in industry and hydrides nitrides carbonyl per acids and their salts fixation fertilizers fuels and furnaces use of electricity in passivity and corrosion of metals use of organic reagents in analysis important mineral resources of India and their utilisation History chemistry from the time of Boyle up to the end of the 19th century

Practical

1 Quantitative Analysis —

- (a) Standard gravimetric and volumetric methods of the following bases and acids from pure substances and their mixtures not involving the separation of more than constituents —

Cu Ag Ca Ba Mg Zn Al Pb Fe Ni NH_4 arsenite
sulphate thiosulphate chloride bromide iodide carbonate

- (b) Available chlorine in bleaching powder and available oxygen in hydrogen peroxide and in Pyrolusite

- (c) Alloys Silver coin nickel coin brass

- (d) Mineral Dolomite magnesite galena

Note—Candidates will be expected to have analysed at least three mixtures under (a) and at least one each under (b) (c) and (d)

- 2 Qualitative Analysis of mixtures of moderate complexity involving not more than seven radicals from the list of radicals prescribed for the B Sc Examination with the addition of the following Arsenate Chromate dichromate permanganate cyanide thiosulphate

Note—Candidates will be expected to have analysed at least six mixtures

3 Simple Preparations such as —

$\text{FeSO}_4(\text{NH}_4)_2 \text{SO}_4 \cdot 6\text{H}_2\text{O}$ chrome alum chrome yellow pure NaCl common salt $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ from Kipp waste AgNO_3 from silver residues $\text{Cu}_2\text{Cl}_2 \cdot 2\text{H}_2\text{O}$ alum from bauxite

Note—Candidates will be expected to have prepared at least three substances

Organic —The B Sc course extended so as to include the simpler synthetic dyes non benzenoid ring natural bases terpenes sugars, organo metallic compounds other compounds containing sulphur enzymes and examples of their industrial uses the chemistry of carbon assimilation (the whole treated in an elementary and representative manner) The theories of geometrical isomerism optical activity steric hindrance

Practical

Preparation of a simple compound

Identification of two simple compounds in a mixture, and preparation of their derivatives

Estimation of COOH group by titration or by silver salt method

Physical —

- 1 Kinetic Theory of matter Deviations in the behaviour of gases
Van der Waals' equation and critical constants Liquefaction of
gases Theory of corresponding states, Avogadro's number
- 2 Relation of physical properties, such as refractivity, parachor,
optical activity viscosity absorption spectrum to chemical constitution
- 3 Phase Rule and its applications to (i) systems of two components,
(ii) alloys (iii) hydrated salts and (iv) binary liquid mixtures
Fractional distillation and steam distillation Allotropy
- 4 Law of mass action and its applications to equilibria in homogeneous
and heterogeneous reactions Effects of temperature and pressure
on chemical equilibrium Distribution Law
- 5 Kinetics of chemical reaction Energy of activation Catalysis,
Absorption
- 6 Electrical Conductivity of aqueous and non-aqueous solutions
Transport Number Theory of Electrolytic dissociation Ostwald's
dilution law Isohydric solutions Hydrolysis Buffer solutions
Ionisation constant for water Solubility product Strengths of
acids and bases Theory of indicators
- 7 Preparation and physical properties of colloids Ultra microscope
and Brownian movement Coagulation and protection of colloids
Stability Electric charge on colloidal particles Application of
colloids
- 8 Laws of thermodynamics Principle of maximum work Gibbs
Helmholtz equation Clapeyron Clausius equation Thermodynamics
and thermo-chemistry Thermodynamical derivations of the
law of mass action, van't Hoff's isotherm and isochore and relation
between osmotic pressure, lowering of the vapour pressure, depression
of the freezing-point and elevation of the boiling point
- 9 Electrode potential E. M. F. of concentration cell with and without
transport and its application pH, Electrometric titrations
Decomposition potential
- 10 Chemical affinity and its measurement

- 11 Positive-ray analysis Mass spectra Isotopes
- 12 X ray Spectra Atomic number Elements of crystallography
Structure of simple crystals
- 13 Radioactivity—natural and artificial Disintegration Theory Radio-
active series of elements
- 14 Emission spectra Rutherford Bohr and Sommerfeld model of the
structure of atom Electronic theory of valency
- 15 Photochemical reactions Laws of photo chemistry (photo chemical
equivalence Photo-sensitisation)

Practical

Physico chemical experiments on the following subjects —

- 1 Molecular weight by the vapour density method
- 2 Molecular weight by the freezing point method and by the
boiling point method
- 3 Solubility of solids in liquids and of liquids in liquids
- 4 Viscosity of liquids solutions and mixtures of liquids
- 5 Surface tension of liquids and solutions
- 6 Velocity of reactions
- 7 Partition co-efficient
- 8 Heats of combustion and neutralisation
- 9 Transition temperature
- 10 Absorption
- 11 Polarimetry
- 12 Refractive indices of liquids solutions and mixtures of liquids
- 13 Electrical conductivity of solutions
- 14 Determination of pH
- 15 Electrometric titrations
- 16 Preparation and purification of colloids nature of electric charge
and coagulation power of electrolytes

FINAL

*Note —Candidates will be required to pass in the written as well as in the
practical examination separately*

Students who have passed the Previous may offer any one of the fol-
lowing branches of chemistry —

(1) Inorganic (2) Organic (3) Physical or (4) Applied

Notice must be sent to the Registrar by the 15th August of the branch
which the student intends to offer at the ensuing examination and in the
case of (4) the industry or manufacture to which he is attached

A student offering Inorganic Organic, or Physical shall present a thesis dealing with original work done by him in his selected branch. The thesis type written and in duplicate, must reach the Registrar not later than one week before the date fixed for the written examination.

In each of these three branches, there will be two papers in addition to the thesis.

In branch (4) Applied Chemistry, the procedure for testing the fitness of a candidate, will be decided as occasion arises.

Candidates will be expected to have a general acquaintance and knowledge of the trend of modern research of the main landmarks in the historical development of Chemistry and of the contributions of workers of outstanding importance towards this development. The following syllabus indicates the scope of the examination —

Inorganic

Paper I Elements and their Compounds

A systematic study of occurrence important methods of extraction, properties and chief uses of the chemical elements and their compounds from the standpoint of the periodic classification.

Manufacturing methods including an understanding of the physico chemical principles involved in the manufacture of —

He H, O, Cl, Fe, Cu, Ag Au Pb Al, Ni Cr, Pt

A general study of the topics given below in addition to the topics mentioned in the syllabus for the Previous M Sc Examination —

Trans uranic elements, silicates ferrous and non ferrous alloys the rare earths, complex compounds, heteropoly acids, technical applications of high and low temperatures, reactions in solvents other than water compounds of inert gases, recent work in new elements.

Paper II Methods and Theories

The scope of the subject matter for this paper will be indicated by the following list of topics —

Atomic structure, transmutation of elements—natural and artificial radioactivity natural and induced, isotopes and their separation application of the electronic theory of valency to acids bases and oxidation reduction structure of molecules and the methods used to study it a general idea of crystals and their structure magnetic susceptibility and Raman spectra in relation to structure of molecules abnormal and anomalous valency spatial configuration of compounds of elements other than carbon determination of atomic weights microchemical methods in outline historical survey of the conception of acids and bases acquaintance with recent analytical methods and methods of preparing new compounds.

Practical

1 Quantitative Analysis

a Determination of three basic and/or acidic constituents from a mixture

1 '9

b Determination of three constituents from alloys

c Determination of two constituents from an ore besides

1 Quantitative Analysis

Acquaintance with standard gravimetric and volumetric methods including the use of iodate bromate titanium trichloride ceric sulphate semi-nitro methods is expected.

2 Quantitative Analysis of mixtures from three or four

a Analysis of mixtures of moderate complexity containing common bases and acids including insolubles not exceeding eight radicals.

b Analysis of alloys, ores and minerals

c Analysis of mixtures containing up to four elements from the following —

Li Be Ce Ti Tr Zr Th V Se Mo W U

3 Preparations

Substances should be selected with a view to the processes and the fitting up and manipulation of the apparatus necessary in their preparation. The following list gives an idea of the types of preparations which may be expected —

Sodium cobaltinitrite sodium thiosulphate potassium permanganate potassium dichromate potassium iodate anhydrous chlorides of Mg Zn Al and Pb Werner complexes hydrazine sulphate hydroxylamine hydrochloride Iodine from iodine residues barium nitrate from barites lead tetraacetate from galgene cerium and thorium compounds from monazite sand and other preparations of a similar nature

4 Acquaintance with methods of water analysis simple gas analysis and use of Lunge's nitrometer and spectroscope

Organic

The following topics in addition to those mentioned for the previous examination will roughly cover the syllabus for the Final Examination in Organic Chemistry —

Electronic theory of valency and mechanism of organic reactions modern organic reagents and their application new methods of analysis structure of organic molecules in relation to the physical properties such as polarizability dipole moments absorption spectra and resonance energy colour and chemical constitution modern theories about optical and geometrical

isomerism, tautomerism, the theory of strainless ring structures, organo-metallic compounds free radicals, carbohydrates, terpenes and related compounds, natural aminoacids, proteins, alkaloids chemistry of porphyrins chlorophyll, anthocyanins and flavones, unsaturation and conjugation, synthetic polymers, carotenoids, vitamins, the steroids, synthetic drugs, perfumes, explosives, fibres

Candidates are expected to have some acquaintance with original papers

Physical

Elementary organic analysis, estimation of halogens, S, N, C and H, estimation of the following groups —OH, NO₂, NH₂, COOH, estimation of simple substances in solution such as glucose and formaldehyde determination of refractive index, optical rotation, saponification and iodine values of oils

Identification of an organic compound of a complex nature, identification of two compounds/components in a mixture and preparation of their derivatives, estimation of a simple organic compound in a mixture

Preparation of an organic compound involving two or three stages, in a pure state

Physical

Knowledge of more advanced nature of the following subjects —

1 Physical properties of elements and compounds, phase rule applied to complex systems Structure of crystals Electron diffractions Radioactivity Positron, Deuteron and Neutron Electronic theory of valency Structure of atom

2 Detailed study of (i) Kinetics of chemical changes, (ii) Chemistry of surfaces; and (iii) magnetism in relation to chemistry

3 Thermodynamics Joule Thomson effect treated thermodynamically Derivations of phase rule and Gibbs adsorption isotherm Donnan's theory of membrane equilibrium Nernst's heat theorem and its applications Entropy and its application to chemical problems

4 Solutions Activity theory of solution Determination of activities Modern theories of strong electrolytes Ionisation in non aqueous solvents Insoluble electrolytes

5 Electro chemistry Oxidation reduction potential Overvoltage

6 Colloids Kinetics of rapid and slow coagulation Solgel transformation Emulsions Gels Colloidal electrolytes

Photochemistry Actinometry Photo chemical yield and quantum efficiency influence of wave length light intensity temperature and other factors on quantum yield Photochemical kinetics Predissociation spectra Mechanism of Photo chemical reactions Photo inhibition Photo chemical after effects Theories of photosensitization Latent images Fluorescence Phosphorescence Chemiluminescence

- 8 Structure of molecules Dipole moment Absorption Raman and band spectra
- 9 Application of physico chemical principles to industrial operations such as in the manufacture of fine and heavy chemicals soaps cellulose rubber and in dyeing printing tanning photography electroplating

Practical

- 1 Determination of the complex formation by the following methods—
 - (i) Cryoscopic
 - (ii) Partition coefficient
 - (iii) Electrical conductivity and
 - (iv) E M F
- 2 Hydrolysis of salts like aniline hydrochloride by the following methods —
 - (i) Partition coefficient
 - (ii) Electrical conductivity
 - (iii) E M F
- 3 Solubility of sparingly soluble salts by the following methods —
 - (i) Electrical conductivity and
 - (ii) E M F
- 4 Determination of pH by the following methods—
 - (i) E M F
 - (ii) Electrical conductivity
 - (iii) Ester hydrolysis and
 - (iv) calorimetric measurement
- 5 Comparison of the strengths of acids and bases by the following methods —
 - (i) Electrical conductivity and
 - (ii) thermoch emical measurements
- 6 Electrometric titrations
- 7 Determination of the dissociation constants of polybasic acids

- 8 Determination of transport number of ions
- 9 Determination of vapour pressure of pure liquids and solutions
- 10 Study of absorption spectra of solutions
- 11 Identification of elements from their emission spectra
- 12 Velocity of reactions
- 13 Determination of the charge on colloidal particles
- 14 Determination of Parachor
- 15 Determination of dipole moment
- 16 Verification of the law of photochemical equivalence

Applied

The principle has been laid down that a candidate will be expected to show that he has *bona fide* devoted himself to some important industry or manufacture and has acquired a reasonable degree of efficiency under all three of the following heads —

- (i) *Technical*—He should have either (a) performed systematic analytical control, (b) engaged in systematic research (c) introduced improved methods of mechanical handling, application or distribution of power etc
- (ii) *Economic*—He should have acquired some knowledge of sources and markets, of costing (including plant, power labour control distribution etc) and of disposal or utilization of by products and waste
- (iii) *Foreign*—He should have studied the methods in use in other countries as far as ascertainable by him

ZOOLOGY

PREVIOUS

A—The structure, development, Binomics and Distribution in space and time of typical representatives and of other examples illustra-

tive of general characters of the principal subdivisions of each phylum of the Non Chordata

B —The general principles of Biology comprising the various theories of Evolution and the subjects of Variation Heredity Sex Adaptation etc

The standard of examination is approximately indicated by the following text-books —

Parker and Haswell Text book of Zoology latest edition two volumes.
Sedgwick Text book of zoology

The student is expected to consult other books of reference as well
There will be three papers —

Paper I—will deal with the Comparative Anatomy and Embryology of Protozoa Porifera Coelenterata Platyhelminthes Nemathelminthes Trochelminthe Mollusca and Echinodermata

Paper II—will deal with the Comparative Anatomy and Embryology of Annulata Arthropoda and Mollusca

Paper III—will deal with the general principles of Biology including the facts and theories of Evolution and the subjects of Variation Heredity Adaptation Selection Isolation Sex and Biometrics

Candidates must produce at the practical examination their preparations and lecture books containing a complete record of laboratory work

FINAL

The subjects for the examination shall be—

A —The structure Development Biometrics and Distribution in space and time of typical representatives and of other examples illustrative of general characters of the principal subdivisions of the Chordata

B —A detailed knowledge of one of the three groups to be announced at least one year previous to the date of the examination The groups selected until further notice are—

*(a) Fishes (including Fisheries)

(b) Reptiles and

(c) Entomology

-A thesis recording original work done by the candidate together with a review of recent literature on the problem investigated by him

A candidate will be required to offer Papers I and II and either (a) or (b) or (c) or (d) of Paper III

Paper I will deal with the comparative Anatomy Embryology, Geographical and Geological Distribution of the primitive Chordata Cyclostomata Pisces and Amphibia

* Special Group—Fishes

1 Structure and development

2 Biology of Fishes

3 Classification and Systematic Survey with special reference to Indian fishes, including Marine, Brackish water, Fresh water and Hill stream Fishes

4 Origin and evolution of Fishes

5 Applied ichthyology

Method of Fishing and Fisheries, including Fresh water and estuarine fisheries, in shore or coastal Fisheries

Problem of Fishing Industries, Fluctuations, cyclic intensities, Migrations, Influence of Plankton

Tinning and canning Railroad transport and marketing Economic survey of fisheries

By products of Fishing Industry Fish oil Fish manure Isinglass etc

6 Maintenance and working of Aquaria, Hatcheries, Rearing and stocking ponds,

Larvivorous Fishes and their utility

In addition to books already suggested for the M Sc Examination the following may be consulted —

NORMAN History of Fishes

ROULE Journeys and Migrations of Fishes

California Fisheries Bulletin

Administration Reports of the Madras Fisheries Department

Administration Report of the Punjab Fisheries Department

Empire Marketing Publication on Fisheries of the British Empire

Recording and Memoir of the Indian Museum

Paper II will deal with the Comparative Anatomy Embryology Geographical and Geological Distribution of the Reptilia Aves and Mammalia

Paper III (a) will deal with Fishes with special reference to the fresh water fishes of the U P

Paper III (b) will deal with Reptiles

*Paper III (c) Entomology

Paper III (d) Thesis

* I —Outline of—

- 1 Insect Morphology (external and internal in a comparative manner)
- 2 Insect Development Embryonic Post Embryonic and Post Metabolic
- 3 Ecology with special reference to climate parasitism relation to plants animals and man population of insects etc
- 4 Palæontology and Ancestry of the major orders of insects
- 5 History of Entomology with special reference to insect lore in ancient India

II —Taxonomy

- 1 General principles of insect Classification International Rules of Nomenclature Faunistics etc
- 2 The students are expected to be able to recognise all the thirty two orders of insects occurring in India and have a specially detailed knowledge of the characters distribution Geological History, Bionomics and Economic importance of —

(i) Thysanura	(ii) Collembola
(iii) Odonata	(iv) Orthopteroidea
(v) Thysanoptera	(vi) Hemipteroidea
(vii) Hymenoptera	(viii) Coleoptera
(ix) Lepidoptera and	(x) Diptera

III —Practical work —

- 1 Study of types for detailed Morphology—

(a) *Poecilocus pictus* (b) *Polistes hebreus*

- 2 Collection and identification of insects common at Algra

Books recommended

- 1 Essig E O College Entomology
- 2 Imm A D Text book of Entomology
- 3 Imm A D Recent Advances in Entomology
- 4 Packard A S Text book of Entomology
- 5 Snodgrass P L Principles of insect Morphology
- 6 Weber H Grundriss der Insektenkunde
- 7 Brandley J C Laboratory guide to wing venation of insects
- 8 Indian Journal of Entomology

Practical

A selected subject shall be studied as much as possible from the practical standpoint. A selected group shall be studied primarily from the local fauna available in the United Provinces and also from other examples of important types.

Candidates must produce at the practical examination their preparations and note books, containing a complete record of laboratory work which will be taken into consideration in determining the results of the examination.

BOTANY

Note—Candidates will be required to pass in the written as well as the practical examination separately

For the M Sc Examination in Botany, Previous and Final, there shall be the following five papers and thesis or Special paper as indicated below—

Paper I Thallophytes

Paper II Bryophytes and Pteridophytes

Paper III Gymnosperms, Cytology and General Biology

Paper IV Angiosperms

Paper V Physiology and Ecology

Thesis or Special paper on *Study of Fungus pests of Crops in the United Provinces*

Out of the five papers, candidates may take any three for the Previous examination, and the remaining two papers and the thesis or Special paper for the Final examination.

Two of the three papers set for the M Sc Examination shall be common for the Previous and Final examinations every year.

- 1 The systematic morphology and life histories of the typical representatives of the principal groups of Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and the Angiosperms
- 2 A knowledge of the more important fossil types
- 3 Physiological Plant Anatomy and Ecology
- 4 A knowledge of "Soil Bacteria" and "Soil Fungi"

Candidates will also be expected to study the phenomena of nutrition of Lichen Algae, Lichen Fungi, and reproduction of Lichens.

- 5 Plant Physiology
- 6 Study of Cytology including the following—

- Protoplasm, Plastids Somatic Mitosis Meiosis Fertilisation Determination of Sex Linkage Cytological basis of Mendelism
- 7 Fundamental facts of variation and heredity and the theories of evolution
 - 8 Principles of Plant breeding
 - 9 Special paper on *Study of Fungus Pests of Crops in the United Provinces*

Or

Thesis recording original work done by the candidate and a brief review of recent literature on the problem investigated by him Two typed copies of the thesis should be submitted a week before the examination

Practical

The Examination hall comprise the following —

- 1 Detailed study of representative types of the different groups prescribed in the syllabus
- 2 Study of Physiological plant anatomy
- 3 Cytological study of suitable specimens
- 4 Demonstration of important phenomena of plant life
- 5 Referring of plants to their families or sub families
- 6 Detailed study of diseased crop plants and the technique connected with work of the life histories of the parasites infecting them or a study of the large aspects of the subject taken up by the student for his thesis
- 7 Visual examination on subjects for the practical examination

The following books are recommended —

Smith Cryptogams Botany Vols I and II

Eames Morphology of Vascular Plants

Thallophytes

West and Fritsch British Freshwater Algae

West Algae

Smith Algae

Fritsch The Structure and Reproduction of the Algae

Harshberger Mycology and Plant Pathology

Gwynne Vaughan Fungi

Gwynne Vaughan and Barnes Structure and Development of Fungi

Heald Manual of Plant Diseases

Brooks Plant Diseases

Fitzpatrick The Lower Fungi

Butler Fungi and Diseases in Plants

Bryophytes

- Cavers Inter-relationships of Bryophyta
 Kashyap West Himalayan Liverworts
 Campbell Mosses and Ferns

Psidophytes

- Bower Origin of a Land Flora
 Bower Ferns
 Beddome Ferns of British India

Gymnosperms

- Coulter and Chamberlain Morphology of Gymnosperms
 Pearson Gnetales
 Chamberlain Living Cycads

Fossil Botany

- Scott Studies in Fossil Botany
 Scott Extinct Plants and Problems of Evolution
 Seward Plant Life through the Ages
 Seward Fossil Plants

Angiosperms

- Coulter and Chamberlain Morphology Angiosperms
 Eames and MacDaniells Introduction to plant Anatomy
 Jeffrey Anatomy of Woody Plants
 Haberlandt Physiological Plant Anatomy
 Sylereder Systematic Anatomy of Dicotyledons
 Willis Flowering Plants and Ferns
 Abber Monocots
 Arber Water Plants
 Rendle The Classification of Flowering Plants
 Hutchinson Families of Flowering Plants
 Skene Biology of Flowering Plants
 Duthie Flora of Upper Gangetic Plain

Physiology

- Palladit Plant Physiology
 Raber Principles of Plant Physiology
 Barton Wright Recent Advances in Plant Physiology
 Miller Plant Physiology
 Stiles Photosynthesis
 Stiles Permeability
 Spoehr Photosynthesis
 Dixon Ascent of Sap
 Dixon Transpiration Stream

- Bose Ascent of Sap
 Bose Physiology of Photosynthesis
 Darwin and Acton Practical Plant Physiology
 Detmer and Moore Practical Plant Physiology
 Wheldale Anthocyanin Pigments in Plants

Geology and Plant Distribution

- Champbell An Outline of Plant Geography
 Schimper Plant Geography
 Warming Ecology of Plants
 Tansley and Chipp Aims and Methods in the Study of Vegetation
 Weaver and Clements Plant Ecology

Cytology and Microtechnique

- Sharp Cytology
 Wilson Cell in Development and Heredity
 Chamberlain Methods in Plant Histology
 Lee Vade Mecum ✓
 Cowdry General Cytology
 Darlington Recent Advances in Cytology

General Biology

- Haldane Causes of Evolution
 Lock Heredity Variation and Evolution
 Bateson Mendelism
 Coulter Outline of Genetics
 Babcock and Clausen Genetics in relation to Agriculture
 Coulter Evolution of Sex in Plants

Also such special references as the teacher may suggest

FACULTY OF COMMERCE

FIRST YEAR B COM COURSE

The subjects of instruction and examination shall be as follows —
1st Year

- (1) English
- (2) Elements of Economics
- (3) Elements of Currency and Banking
- (4) Book-keeping and Accountancy
- (5) Business Methods
- (6) Economic and Commercial Geography

A departmental examination will be held at the end of the first year

- (1) English

Questions will be set on the following —

- (a) Draft of Commercial and Official Correspondence
- (b) Explanation of terms and passages occurring in market reports
- (c) Precis of a suitable passage
- (d) Re writing of incorrect or badly constructed sentences
- (e) An essay on a subject of general interest

- (2) Elements of Economics

Production—Analysis of the expenses of production factors which limit Supply

Exchange—Prices, Laws of Supply and Demand

Consumption—The basis of demand, wants budgets and the division of Income

Distribution—Rent Interest, Wages and their difference

The Supply of Capital and Credit Co operative credit

The Supply of labour and population

Organization and Management—The Principle of Substitution

Large and small scale production

Division of labour Machinery

- (3) Elements of Currency and Banking

- (a) Currency—The origin of money barter, grain payments Money and its functions Coins and the currency system, legal tender Standard and token money Legal basis of money Mint price of gold or silver parity of exchange Gresham's

law Paper Currency Convertible and inconvertible credit instruments Bills of exchange cheques hundies

- (b) Banking—The functions of a bank Balance sheets The cheque system and the clearing house Means of inland remittance Growth of Banking in India—Mahajans Chetties Shroffs Early joint stock banking The Presidency Banks The Imperial Bank The present joint stock Banks—European and Indian Government control of banks Information to be made public Other means of protecting customers Post Office Saving Banks An elementary treatment of the present system of currency (including paper currency) in India

(4) Book keeping and Accountancy

The Principles of Double Entry Book keeping and their application Books of Original Entry The Ledger Trial Balance Trading and Profit and Loss Accounts with apportionments Balance Sheet

In the treatment of the above the following matters will be included

Cheques Bills of Exchange and Promissory Notes Goodwill Classification of Assets and Liabilities Depreciation and Reserves (elementary) Co-partnerships Joint Venture and Contract Accounts Elementary Partnership and Company Accounts

(5) Business Methods

The general routine of a Business House Inward and Outward Correspondence including Drafting and Filing Methods of Rapid Communication Duplication Processes

The significance of Trade Commerce and Industry Manufacturing and Distributing Houses The buying and selling of goods Importation and Exportation with an elementary knowledge of fire and marine insurance applicable thereto

The meanings of the principal commercial terms occurring in connection with the above and preparation of the chief documents involved including the arithmetical calculations

(6) Economics and Commercial Geography

Climate—Annual distribution of temperature and rainfall with emphasis on these factors divide the world into climatic regions

Natural regions of the world in relation to climatic regions their natural vegetation animal life occupations and products

Soil (outline only) — Classes and properties, preservation of soil—irrigation, dry-farming

Commercial Products — Each according to its properties and utility, requirements of climate, soil etc distribution and commercial importance (a) generally, (b) in India

- 1 Vegetable products, including forest products
- 2 Animal commodities
- 3 Fisheries
- 4 Mineral Wealth

Sources of power Studies of distribution maps Growth of Towns
Means of Transport

B COM EXAMINATION

1 English—

Paper I—

This paper will consist of two parts The first part will contain questions on prescribed prose text books of the B A standard including critical and explanatory questions dealing with the subject-matter

Prescribed books—

(1) Ruskin's *Crown of Wild Olive*—The following lectures only—

- (i) Lecture on Work
- (ii) Lecture on Traffic

(2) (a) Essays by Sir Arthur Helps (Walter Scott Ltd, London)
The following Essays only—

- (i) On Practical Wisdom (ii) Aids to Contentment, (iii) On Self-discipline (iv) On our judgment of other men (v) On the exercise of Benevolence (vi) Domestic rule (vii) Advice (viii) Secrecy (ix) On the education of a man of business (x) On the transaction of business (xi) On the choice and management of Agents (xii) On the treatment of Suitors (xiii) Interviews (xiv) Of Councils, commission etc (xv) Party spirit

(b) Dickinson and Sharma Two twentieth Century Addresses containing the addresses on Criticism before and after the war

(3) My life and Works by Henry Ford (William Heinemann Ltd)
[Introduction and Chapters I and II only]

Questions on Text shall be confined to the general subject matter and purely literary questions shall not be put

The second part will consist of questions on General English comprising one or more unseen prose passages for summarising or explanation of the same standard as for B A or B Sc General English

Paper II — An essay on a subject of Economic or Commercial interest

II Commerce—

Paper I — Business Organisation

- [1] Nature and constitution of business houses (sole traders' partnerships and joint stock companies)
- [2] Methods of financing business concerns
- [3] Organisation of retail houses (including departmental stores multiple shops and mail order concerns) wholesale houses and manufacturing businesses
- [4] Formation and working of joint stock companies including secretarial work
- [5] Modern methods of publicity
- [6] Insurance
- [7] Stock and produce exchanges including a study of stock and commodity market reports
- [8] Rationalisation—Business combinations scientific management methods of remunerating labour
- [9] State in relation to industry

Books recommended—

Davis Business Organisation

Haney Business Organisation

Thomas Commerce

Shields Industrial Organisation

Paper II — Commercial and Industrial Law

- (1) Indian Law relating to contracts (including sale of goods bailments indemnity and guarantee agency and partnership) negotiable instruments arbitration and insolvency Indian labour legislation

- (2) Elements of Indian company law

N B —Forty per cent of the marks allotted to this paper shall be reserved

for questions on Indian Company Law

Books recommended—

Davar Mercantile Law

Sen and Banerji Mercantile Law

Paper III—Statistics

- 1 Meaning and scope of statistics Fundamental principles
- 2 General methods of statistical investigation Collection of statistical data Determination of statistical units Sources of data Estimation Classification of statistical observation
- 3 Tabular Presentation—Single tables—frequency tables—correlation tables—abstraction—mechanical tabulations
- 4 Diagrammatic Presentation—Chtogrm—Bar diagram—Polar diagram—Surface diagrams rectangular and circular Volumes of three dimensional diagram—conventional forms
- 5 Graphic Presentation—Histograms—simple percentage cumulation, Histograms—absolute percentage—Trend
- 6 Averaging—Types of averages—simple, weighted, modal, median, moving average—statistical coefficient
- 7 Methods of Dispersion—Meaning and purpose—absolute and relative dispersion—the Range—mean deviation—standard deviation—quartile deviation—‘mean differences’—skewness
- 8 Principles of index number—making and using—the Base, the choice of an average weighing method of aggregates—relatives of aggregates—average of relatives—chain averages
- 9 Interpolation—Graphic and simple algebraic methods
- 10 Correlation and ratio of variation—Karl Pearson's Co efficient of correlation Application to groups—series, long time and short time fluctuations Methods of concurrent deviation—Lag-Galton graph and regressions
- 11 Application of statistical methods to Indian commercial problems prices, wages, trade and transport Certain sources of official statistics in India

Books recommended—

KINC Statistical Method

BODDINGTON Statistics

DUPPA and AGARWAL Elementary Statistics

GHOSH and CHAUDHRI Statistics
(Published by the Indian Press Ltd)

III Economics

Paper 1 —Principles of Economics

- 1 **INTRODUCTORY** —Scope and subject matter of the science divisions and their inter dependence Economics a part of Sociology Relation of Economics to other sciences
- 2 **METHODS** —Deductive and Inductive methods as applied in Economic Science
- 3 **DEFINITIONS** —e.g. Wealth Labour Value Money Price Capital Land etc.
- 4 **CONSUMPTION** —Wants Definitions of total and marginal utility Demand schedules and curves Elasticity of demand Consumer's surplus Fashions and Customs with their effects on Demand
- 5 **PRODUCTION** —The factors or agents of production Land labour capital and organization Combination of the factors in varying proportions Relations of the Law of Diminishing Returns and investment
- 6 **LAND OR NATURAL RESOURCES** —Qualities situation and fertility climate minerals sources of power
- 7 **LABOUR** —Distinctive qualities skilled and unskilled labour division of labour conditions of efficiency labour Influence of social customs
- 8 **Capital** —Conditions of accumulation of capital Economic characteristics of machinery
- 9 **Organization of Production** —Large and small scale production advantages and limitations of each Supply schedules and long period cost of production curves Diminishing Constant and Increasing returns Principle of substitution Inventions Specialisation of the factors of production Localisation of industries
- 10 **Co-operation** —Agricultural and Urban the theory and organization of credit distributive and purchasing societies co-operative production—its advantages and its weaknesses
- 11 **Exchange** —Theory of barter Conditions of gain of utility by change Definition of a market Extent of the market Balancing of supply and demand Temporary equilibrium of demand and supply Joint supply and composite demand Short and long

period Equilibrium of demand and supply Monopolies Determination of monopoly price in actual practice Speculation and organized markets

- 12 DISTRIBUTION —Balance of demand and supply for the factors of production The principle of substitution Mobility of the factors of production Effects of introducing new methods and inventions
- 13 RENT —Gross and net rent The Law of Rent Economic Rent, various forces determining it Effects of improvements in Agriculture and transportation on rents The relation of the law of diminishing returns to rent
- 14 INTEREST —Demand for and supply of capital Differences between short and long term investments Mobility of capital, between localities, between industries and from less to more specialised forms of fixed capital Gross and net interest Tendency to equal return on equally risky investments The rate of return and the rate of interest Quasi Rent
- 15 WAGES AND THE POPULATION QUESTIONS —General conditions effecting demand for and supply of labour Positive and preventive checks Real and nominal wages Apparent differences in wages Mobility of labour Differences of wages in short periods, their equalisation Time and piece wages Relation of labour and capital The relation of population to the law of Diminishing Returns Over population and under population
- 16 PROFITS —Normal profits as the reward of management and risk taking and surplus profits as the result of special advantages in time, place and legal rights
- 17 Cause of national wealth and progress

Books recommended—

TAUSSIG Principles of Economics Vols. I and II

THOMAS Elements of Economics

L. BENTHAM Economics (Pitman)

Paper II —Currency and Finance

NOTE —Candidates are not expected to possess a detailed knowledge of the subject

Currency—The functions of money, qualities of good money material importance of money various kinds of money Quantity theory of money value Inflation and deflation Index numbers Various methods of

Note issue War and the ruin of the gold standard. Post war restoration of the gold standard Economic depression and the gold standard

Banking—The nature of Banking Types of Banks functions of a modern banker banking operations Banking and money market Fluctuations in bank rate in relation to trade industry and commerce

The Indian currency system a brief historical retrospect from 1870 to 1935 Recommendations of the Hilton Young Currency Commission 1926 The present currency system in India

Indian Banking System—Exchange banks Joint stock banks Co-operative banks The Imperial bank The Reserve Bank of India Defects of Indian Banking organisation Lines of future Banking Development

International Trade and Foreign Exchange—Advantages of Foreign Trade International currency Mint Par Specie Points Fluctuations in the rate of exchange Exchanges during the war and post war exchanges

Public Finance—Classification of Public Revenues and Expenditure—Canons of Taxation Incidence of Taxation Public Debt Principal heads of income and expenditure of the Central and the Provincial Governments in India

Books recommended—

KRISHNA KUMAR SHARMA Indian Money Market

KRISHNA KUMAR SHARMA Currency and Commerce

JATHER AND BERRY Indian Economics Vol II

HAI ROD International Economics (Camb University Press)

ROBERTSON Money

L C JAIN The Monetary Problems of India

C N VAKIL Currency and prices in India

SAYER Modern Banking [O U I]

B R MISRA Indian Provincial Finance (Oxf Press)

Paper III—Modern Economic Development and

1 The influence of geographical and development of India and England

2 Economic organisation of India and 19th century Later Developments

3 LAND AND AGRICULTURE—Brief before 1857 Effects of Agriculture after 1857 Famines Land tenure Yield of crops Irrigation Agricultural co-operation State and

The English Agrarian Revolution and its results Effects of international competition on English agriculture Developments during the 2nd century Problems of today

4 Industrial Development Brief study of Indian industries before 1857 Causes of decline of Indian industries Factory development Detailed study of organised industries in India Cottage industries State and Indian industries

Industrial Revolution in England, its causes developments and effects Leading British industries and their future

5 Labour Problems, Factory Acts Trade disputes and Trade Disputes legislation Trade Unions Social Insurance Problems of labour welfare and efficiency [in India as well as in England]

6 Transport Railway development in India Roads Rail-road competition Rivers and canals India's demand for reservation of her coastal trade Indian shipping and ship-building industry Indian airways

The Navigation Acts of England Growth of British railways Inland waterways in England British shipping and airways

7 Trade and tariffs India's foreign and internal trade after 1857 Protection in India Imperial Preference Indo British and Indo Japanese Trade Pacts Recent tendencies in India

British Corn Laws Free Trade Effects of international competition on England Foreign Trade Imperial Preference Ottawa Agreements Future of British foreign trade

Books recommended—

IV SPECIAL SUBJECTS

(a) *Advanced Accountancy And Auditing*

Paper I —

Principles and practice of Double Entry Book keeping Capital and Revenue Depreciations Reserve and Sinking Funds

Partnership accounts Accounts of limited companies including reconstructions amalgamations and liquidations The Double Account system Departmental and Branch accounts Insolvency accounts Bank and Insurance companies accounts

Paper II —

- 1 Income tax in relation to accounts
- 2 Interpretation and Criticism of published accounts
- 3 Either elements of cost accounting or the principles and practice of Indian system of Accountancy

** B — About one half of the full marks of this paper (i.e. not less than 20 and not more than 50 should be assigned to questions on Income tax in relation to accounts and the remaining marks should be allotted to questions on the rest of the course of this paper. The questions on the Indian system of Accounts may be answered in English or Hindi or Urdu*

Paper III —

The objects and scope of audit Vouching and verification Audit of revenue accounts and balance sheet Depreciation and reserves Divisible profits and dividends

Rights duties and liabilities of auditors

Special points arising in the audit of banks cinemas hotels and jute cotton tea coal sugar electric supply light Railways and insurance companies

Investigation of Accounts

Books recommended—

SPICER and PEELER Book keeping and Accounts

BATLIBOI Advanced Accounts

DROPPER Accounting

DE SILVA Principles of Auditing

LANCASTER Principles and Practice of Auditing

BODDINGTON Financial Statements (Litman)

K. M. BENTHIA Hindi Bahu Khata (Rajputana Book House Ajmer)

(b) *Advanced Banking*

Paper I —

- 1 Recent Monetary History and Monetary Controversies Recent discussion of the nature and adequate definition of money The problem of the Standard The triumph of the Gold Standard in the last third of the nineteenth century The re-opening of Controversy re Bimetallism The Gold Exchange Standard, the Theoretical implications of the Gold Exchange Standard The effects of the War—Inflation and Dislocation of Exchanges The rise of prices and the suggested stabilisation of the value of money Fishers Compensated Dollar Banking Policy and the price Level The spread of Banking and the evolution of Banking theory The War and the ruin of the Gold Standard Cassel's theory of the Foreign Exchanges The monetary theory of the Brussels and Geneva Conferences Monetary stability The return to Gold Present Problems
- 2 International Trade The Principles governing the existence and distribution of international trade Statistical problems in the measurement of international trade The organization and operation of international markets The balancing of international indebtedness Taxes on Imports and Exports Incidence of such taxes Protection and Free Trades Imperial Preference
- 3 Foreign Exchanges Types of bills of exchange—The mechanism of foreign exchange payments Foreign exchange markets Bankers and foreign exchanges The rates of exchange Purchasing power parity Influences affecting the rate Forward exchange Arbitrage The silver exchange Dislocation of exchanges The problem of stabilisation How to read the foreign exchange article

Paper II —

- 1 A detailed study of the Indian Money Market Defects of Indian Banking Effects of the War A Central Bank of India Adequacy and stability of the money market in India Agricultural credit Agricultural indebtedness Co-operative credit its development and present position Industrial Banking and Finance in India Indian Public Debt Post Office Savings Bank Schemes Means to promote banking development

- 2 A detailed study of the Indian Currency System Currency Policy in India The Gold Exchange Standard its working in other countries
- 3 Comparison of the banking systems of England Germany France the U S A and Indian Recent banking developments

Paper III—

- 1 The ordinary practice of bankers with regard to the opening and conduct of banking accounts Cheques forms endorsements crossings forgery and alteration banker's marks on cheques termination of banker's authority to pay cheques Bills of exchange forms endorsements acceptance acceptance for honour case of need noting protest stamp duties discharge of a bill Theory and characteristics of negotiability Discounting of bills of exchange
- 2 Banker's credits traveller's letters of credit circular notes confirmed banker's credits unconfirmed banker's credits London acceptance credit documentary credit revolving credit
- 3 Banker's advance advance against marketable securities goods and produce real property ships guarantees debts debentures of companies unsecured advances
- 4 Banking Investments Deposit of valuables with the Bank Banks and customers Mechanism of the clearing house system
- 5 Bank organisation management and accounts
- 6 Banking law relating to cheque bills of exchange promissory notes

Books recommended—

DADACHANJI History of Indian Currency

FANNAN Practice and law of Banking

DAVAR Practice and Law of Banking

SPALDING Banker's Credit

KISCH Central Banks

PANANDIKAR Banking in India (Longmans)

SAYER Modern Banking (O U P)

WHALE International Trade (Home University Library)

TRUPTIL British Banks

MACKENZIE Banking systems of Great Britain Germany France and U S A (published by Macmillans)

Report of the Macmillan Committee on Industry and Finance (His Majesty's Stationary Office)

Report of the Indian Currency Committee and Commission
Report of the Indian Fiscal Commission

(c) *Geography*

Paper I —

1 Physical Geography involving broad knowledge of rocks, denudation, land forms soils—formation classes use, maintenance, etc—important economic minerals and their distribution

2 The atmosphere—Temperature and pressure of the air, movement of atmosphere, winds, cyclones and anticyclones, Permanent winds, rainfall major climatic types and correlated vegetation and animal life. Reading of climate and weather maps

3 Production and trade in important commodities together with the industries based on them such as Rice, Wheat, Tea, Sugar, Cotton Wool Jute, Coal, Iron and Petroleum Chemicals and Fisheries

4 Transport [a] A few important trans continental railways and their significance, [b] important ocean routes, [c] important air routes, particularly to India and the Far East and their commercial significance, [d] Trade Centres Port towns and Industrial Centres

Books recommended—

NEWBIGIN Physical Geography

CHISHOLM and D STAMP A Hand book of commercial Geography

RUSSEL SMITH Industrial and Commercial Geography

GREGORY Economic Geology

LYDE A Primer of Economic Geography

R N DUBEY Economic and Commercial Geography of the world

A Wilmere Ground work of Modern Geography

PICKS Introduction of Geography

Paper II —

General Economic and Commercial Geography of Asia with special reference to India This will involve a study of the physical features, climate, natural vegetation, mineral resources sources of power, agriculture industries and trade of the leading countries on a regional basis

Books recommended—

Bergomerg Economic Geography of Asia

I D Stamp Asia

Vern Anstey Trade of the Indian Ocean

Lyde Asia

Indian Year Book (Times of India Bombay)

Indian Finance Year Book

Paper III —

A study of any one of the following on the same lines as above

(i) North America and Europe with special reference to Great Britain and U S A

Or

(ii) The Southern continents with special reference to British Dominions

Books recommended —

Shackleton Regional Geography of Europe

Laborde Western Europe and British Isles

Lyde Continent of Europe

Jones and Bryen North America

Or

Russell Smith North America

Whitbeck Geography of South America

Suggate Africa

Taylor Australasia (Physiographical and Economic)

Whitbeck and Finch Economic Geography

(d) Insurance

Paper I — Life Assurance

Principles and practice of life assurance Use and purpose of the proposal and forms associated therewith Life assurance contracts their nature and characteristics Insurable interest Parties to the contract and their rights and duties Conditions and terms of policy and effect of non compliance therewith Assignment claims surrenders Re assurance Types of assurance The prospectus—its general construction and uses

Life office organization practice in connection with collection of premium renewals loans surrenders claims and annuity payments Compilation of statistics and records

Mortality tables the general nature characteristics and use of the principal table including an elementary knowledge of the methods of construction Life office valuations sources of profit and methods of distribution

Paper II —Other Classes of Insurance

Fire The basic principles of fire insurance contracts Fire policy conditions and their meanings Insurable interest Assignment policy Subrogation Contribution Average, claims proximate cause onus of proof abandonment and reinsurance Average clauses and loss apportionments

Marine Contract of marine insurance Insurable interest and value disclosure and representation The ship and policy Premium and return of premium Double insurance Assignment policy Warranties The voyage, Its abandonment, partial losses and particular charge, salvage General average measure of indemnity Subrogation, General Average Lloyd's

An elementary knowledge of workman's compensation, insurance, motor Insurance and burglary insurance

Paper III —Insurance Office Organisation

Constitution of insurance companies Office, machines, staff organisation, management and remuneration Officers of the company Insurance organisation Correspondence Advertising Branch control Agency Secretarial Matters Various returns under the Indian Companies Act and the Indian Life Assurance Companies Act Insurance Accounts and investments

Books recommended—

YOUNG Insurance (Pitman)

LIRGH Guide to Life Assurance (Pitman)

TAYLOR and TYLER, Life Assurance from Proposal to policy (Pitman)

ELDERTON and FIFFARD Construction of Mortality and Sickness Tables (A & C Black Ltd)

Indian Life Assurance and Provident Insurance Societies Acts and Rules thereunder

T D DUTT Law Relating to Life Assurance in India

BROOKE Fire Insurance Principles and Practice (Post Magazine, London)

GODWIN Principles and practice of Fire Insurance (Pitman)

TEMPERLEY Marine Insurance (Macdonald and Evan, London)

LAL Principles of Insurance (Pitman)

WATSON Talks on Insurance Law (Pitman)

WELSON and SHERRIFF In ur nce Office Organisation (Pitman)

WELSON AND HAMMOND Insurance Accounts and Investments (Post Magazine London)

(e) *Rural Economics*

Paper I

(a) Peculiar features of agricultural production as distinguished from manufacturing Bases of agriculture soil sources of power irrigation drainage implements and machinery seeds manures and cattle Study of these with special reference to Indian conditions Systems of farming in India and various types of rotation combination and distribution of crops met with in India Agricultural improvement and the work of the Agriculture Department in India Marketing of Agricultural produce

(b) Village communications

(c) Marketing of agricultural produce

Paper II

Types of villages in India Historical survey of land revenue in India. Systems of revenue settlements Principles of assessment Consolidation of agriculture holding Ricardian theory in relation to land revenue in India Application of the principles of taxation to land revenue Tenancy legislation in the U P Organisation for the administration of land revenue

The importance and possibilities of cottage industries including subsidiary agricultural industries such as dairy farming poultry farming fruit culture and market gardening etc

Constitution functions and finances of district board and village panchayats

Paper III

Rural indebtedness its causes and remedies State policy regarding rural indebtedness with special reference to U P Measures to avoid unnecessary debts Restrictions on the transfer of land The village money lenders Co-operative credit movement Co-operation in Germany and Denmark Its usefulness to India Acts of 1904 and 1912 The various co-operative societies and their achievement Land mortgage banks and State help to them The Madras and Bombay schemes

The rural reconstruction movement village administration sanitation recreation and housing

Books recommended—

Government of India Resolution on Land Revenue Administration in India of 1902

SELIGMAN Economics of Farm Relief

HOWARD Crop production in India

N G MUKERJI Hand book of Indian Agriculture

CARVER Principles of Rural Economics

HOLMES Economics of Farm Organisation and Management

Report of Royal Commission on Agriculture in India

U P District Boards and Village *Panchayats* Acts

Report on the working of District Boards in U P

U P Banking Enquiry Committee Report

B G BHATNAGAR Co operative Organisation in India

H L KAJI Co operation in India

STRICKLAND Co operation in India

BRAYNE Re making of Village India

DARLINO The Punjab Peasants in Prosperity and Debt

OAKDEN Report on Co operation in the United Provinces

(f) *Secretarial Practice*

Paper I

A detailed study of the Indian Companies Act together with rules made thereunder

Paper II —The work of Secretaries of limited companies in India with particular reference to—

- 1 Formation, issue of capital, prospectus, underwriting memorandum and articles of association
- 2 Office organisation, labour saving equipment, filing system
- 3 Correspondence, circulars to shareholders, reports financial and statistical returns
- 4 Statutory books, returns to be filed with the Registrar
- 5 Transfer of shares and debentures payment of dividends and interest
- 6 Procedure at meetings of directors and shareholders kinds of meetings and resolution notices agendas, minutes, proxies methods of voting

Paper III —Company accountancy Indian Income Tax law Elementary knowledge of current financial and commercial topics

(g) *Actuarial Mathematics***Paper I—Algebra including Probability**

Permutation and combination binomial exponential and logarithmic theorems inequalities convergency and divergency of series partial fractions recurring series

Probability as given in *Mathematics for Actuarial Students Part II* by Harry Freeman

Paper II—Differential and Integral Calculus

Elementary differential and integral calculus as given in *Mathematics for Actuarial Students Part I* by Harry Freeman

Approximate integration as given in *Mathematics for Actuarial Students Part II* by Harry Freeman

Paper III—Calculus of Finite Differences

Calculus of finite differences including direct and inverse interpolation and summation as given in *Mathematics for Actuarial Students Part II* by Harry Freeman

Note—The Mathematics for Actuarial Students Parts I and II is published by the Cambridge University Press and is available in India at Macmillans

MCOW EXAMINATION*I—Corporation Finance*

Promotion of a joint stock company Construction of Financial Plan Capital Structure Types of corporate securities Marketing of securities need for special institutions Underwriting of securities Investment intermediaries Stock exchanges working capital Short term Finance

Management of earnings Exploitation of companies Financial re-organisations Industrial mergers

II—The Organisation of Industries

A detailed study of the organisation finance and management of the leading industries of India viz Cotton Jute Iron and Steel Engineering Sugar Cement Paper and Pulp Match Coal Glass and Heavy chemicals The Managing Agency System—Its advantages and defects The Basis of Modern Industry Resources—Natural and Human Capital Labour Legislation and Organisation Welfare Work Combination Movement in the Indian Industry State in relation to Industry The Tariffs

The principal Cottage Industries of India

III — The Organisation of Markets

Significance of a knowledge of marketing Evolution of marketing organisation and practice—conditions prior to the Industrial Revolution, modern industrial and commercial developments, changes in marketing organisations and methods

The characteristics of the market Meaning of the term market a perfect market, an organised market, different concepts of the market (place, organisation, price making), classification of buyers and sellers, classification of goods, factors that control a market, importance of co-ordinating production with demand

Marketing functions, The marketing process, concentration and dispersion, buying, selling transportation, storage, grading finance and risk-bearing functions

Methods of wholesale distribution The operating problems of wholesalers Organised wholesale markets

Methods of retail distribution and operating problems of retailers, multiple shop system, departmental stores, co-operative stores, etc

Methods of mail order business

Methods of sales promotion Brands and Trade Marks, Personal Selling, Press and other forms of advertising

Marketing of agricultural products with special reference to U P Rajputana or Central India (Cotton, Wheat, Jute, Rice, Seeds, etc)

Co operative marketing of agricultural products in India

Marketing of industrial goods

Marketing of Shares and Securities

Financing marketing activities

Market risk and hedging

Regulation of markets

Government Marketing Organisation Trade Commissioners, Marketing Officers

IV — Banking and Foreign Exchange

(1) Monetary systems of the leading countries International Monetary Funds

(2) Comparative study of the organisation of the Central and other banks of India, England, United States of America and Germany

(3) Important International money markets and their distinctive features

(4) Importance of foreign exchanges in modern economic development
Regulation of exchange rates Fundamental causes of exchange movements,
the purchasing power parity

(5) Dealings in bills of various kinds Investment in exchange Borrowing
by means of exchange Speculation in exchange

(6) Arbitrage Special shipments

V — *International Trade and Fiscal Policy*

The distinguishing features of International transaction The study of
international trade as a special aspect of trade in general comparison with
inter regional trade The international division of labour The theory of
comparative costs Recent criticisms and elaborations of the classical
doctrine The gain from foreign trade The barter terms of trade

International payments in relation to monetary systems The theory of
international prices The theory of purchasing Power parity The Balance of
payments theory of foreign exchanges The mechanism of foreign exchanges
Bills of exchange Letters of credit and other media of international pay-
ments Long and short exchanges Forward exchanges The place of gold
in the international monetary systems The future of gold National
monetary autonomy Exchange Control Exchange equalisation funds
Council Bills and Reverse Council Bills India's foreign Exchange

International capital movements Equilibrium and disequilibrium in the
balance of payments Favourable and unfavourable balance of trade
Relation between balance of payments and interest rates and prices
Classification of transactions and their mutual interdependence The foreign
trade and balance of payments of India Statistics relating to India's foreign
trade Home charges

The theory of fiscal policy Free Trade versus Protection Bilateralism
Recent developments in international trade and fiscal policy in the world
The changing trend of trade Trade of the industrial and agricultural
countries Tariffs and Quotas The technique of tariffmaking Most favoured
nation clause India's fiscal policy Discriminating protection Ottawa
Trade Agreement and the Indo Japanese Agreement

VI — *Transport*

1 *Railway Transport*—(a) Capital and Expenditure Combinations
Rates and Fares Classification of goods and minerals Discrimination and
undue preference State Regulation of rates and fares State ownership and

(b) Divisional versus Departmental organisation Passenger and goods
stations working Rolling Stock Distribution Marshalling Yards Wagon
pooling

2 *Indian Railways*—Development Relation to the State Management Railway Finance, Relation to one another Internal administration and executive organisation Changes suggested by the Acworth Committee

3 *Road Transport*—Economies of road construction and maintenance Theories of rates and fares Types of road transport Relation to the State, Relation of road to railway transport Roads and road transport as means of opening up undeveloped and outlying tracts

4 *Sea Transport*—Outline of its development Organisation of ocean transport service Economies of marine transport, rates and fares Competition and monopoly Rate and traffic agreements Pools and Conferences Shipping rings The Deferred Rebate System and the Rate War Government aid and regulation of Ocean Transportation Port, their functions and dues Influence of the Great War on shipping Indian Mercantile Marine The Indian Navy

5 *Air Transport*—Modern Developments Commercial possibilities of Air Transport International Air Navigation Commercial Organisation of Air Services State versus Private Co operation Basic Principles of land and Economic Factors in the operation of services Ground Organisation, Traffic control Passenger, Freight and Mails Present development of air transport in India

VII—Law and practice of Income tax

Law and Practice of Indian Income-tax

VIII—Company Accountancy

System of accounting suitable for companies engaged in different trades and industries, construction and criticism of published accounts

IX—Principles and practice of Auditing

Internal audit Technique of auditing, with special reference to limited companies

Investigations Reports Other accountancy work falling within the scope of a practising accountant

Rights duties and liabilities of auditors

X—Secretarial Work

A detailed study of Indian Company Law Company secretarial work and practice Elements of Company accountancy and income tax and excess profits tax General knowledge relating to commerce and finance

XI—Statistics

(1) Collection, Classification, Tabulation, Presentation Comparison and Interpretation of Statistical data

Correlation Logarithmic Curves and Curves representing the law of diminishing returns etc based on statistics Association and contingency Graphic Algebraic and other methods of interpretation and extrapolation Forecasting of fluctuations of economic phenomena Methods of measuring and forecasting of population growth Accuracy and sampling Significance of observed differences between averages

(2) Collection of data (official and private) and actual construction of tables diagrams etc based on those data regarding any one of the following Wages Prices Population Family Budgets Marketing Surveys

(3) Importance of Statistics in India Availability and adequacy of statistics in India Need for more intensive and extensive investigation in India

XII—*Labour Problems*

British Labour Movement—History up to the present time Trade Unions structure functions and Government Industrial peace conciliation and arbitration Education and Research Department International connections

Indian labour—Village background connection and influence Recruitment condition security promotions Hours Wage Minimum Wage Child labour

Labour of Women Trade Unions Characteristics history future industrial peace works committee Machinery for conciliation and arbitration Health diet maternity benefits industrial diseases town planning housing village settlements Building regulations and sanitation Education general and technical agencies Debts co-operative credit and distributive store

Life of labouring classes in typical Indian industries cotton jute coal metallurgical mining shipping railways plantations canal industries

Labour and the constitution central provincial and municipal

Labour research and statistical bureaux

International Labour Organisation Pre War history Constitution Organisation and Functions Achievements Prospects

XIII—*Co-operation*

Co-operation as a principle Its application to modern business history Its genesis and development in Europe This part is to cover all the European countries about which literature is available such as Germany Italy Russia France Denmark and England

Co-operation in India Its evolution and history Co-operative law in the various provinces Various forms of co-operative activity credit and non credit—their constitution and working principles

Various forms of co-operative activity Degree of success achieved in the various provinces

Organisation for propaganda and control Co operative Finance and Accounting Co ordinating and higher agencies in the Co operative Movement Criticism of the existing things and lines of further developments

XIV — Rural Economics

(1) Rural Organisation — A historical sketch Leading features of village life in India at present Famines

(2) Organisation of agriculture and the scope of co operation therein —

(a) Irrigation and dry farming, manuring and rotation of crops

Implements, Live Stock

(b) Consolidation of holdings

(c) Credit and Indebtedness

(d) Marketing

(3) Land Tenures and Assessment with special reference to U P

(4) Agricultural Education, Research, Demonstration and propaganda

(5) Local Boards Education, Sanitation, and Public Health, Roads

(6) Problems connected with pasture lands and forests

(7) Subsidiary occupations for agriculturist

XV — Public Finance

Importance of Public Finance

Public Revenue, Principles of Taxation Problems of incidence Taxation of monopolies Tax and non tax revenue Effects of taxes on production and distribution

Public Expenditure its effects on Production, Distribution and Consumption

Public Debt various forms of public debt Method of repayment

Public Debt in India

Financial Administration

Finances of Government of India provincial governments and local authorities

War Finance

XVI — Economic and Commercial Geography

A detailed study of the economic and commercial geography of India based on the natural environments involving both a topical and regional study on the following lines —

Position structure and geology, physical features and land forms, climate and weather irrigation, natural resources mineral forestry, animal and agricultural and the industries and occupations depending upon them

Important sources of industrial power and important manufacturing industries Internal and foreign trade of the country Quantity quality direction and development of foreign trade A detailed study of exports and imports and future possibilities of change Communications and transport facilities—railway roads waterways and airways Important sea routes connecting India with other parts of the world Important industrial and trade centres and ports A brief study of commercial policy

VIII—Stock exchange

Functions of stock market History of the principal stock exchanges of the world Developments of stock markets in India Constitution of Indian stock exchanges Classes of securities Transaction of business short selling options and arbitraging Fluctuations in security prices Official quotation and listing regulations The recent war and stock exchanges Stock exchanges reform in India

XVIII—Insurance

A detailed study of either (a) Life Insurance or (b) General Insurance

EITHER

(a) LIFE INSURANCE

Principles and practice of Insurance The contract Insurable interest Policy conditions Compound interest tables Mortality tables kind of policies calculation of premiums occupational risks under average lives valuation reserves bonus distribution title to policies of life insurance assignment of policies surrender values

Life office organisation life insurance salesmanship investment of life office expenses

Insurance book keeping official returns law of life insurance

Or

(b) GENERAL INSURANCE

Fire Insurance Basic principles of fire insurance contracts including a knowledge of fire policy conditions and their meanings average war warranties moral hazard fire waste cost price of life insurance and unexpired risk

Practice of fire insurance including modifications and developments reinsurance renewals settlement of claims assignment of policies

Other Classes of Insurance—Principles and practice of other classes of general insurance viz marine accident motor guarantee burglary public liability workmen's compensation

FACULTY OF LAW

LL B EXAMINATION

Premious

The following Text books and Acts are recommended —

Paper I—Roman Law

Hadley Roman Law

Maine Ancient Law, Chapters 1 2 3 6 and 9

Paper II—The Law of Contracts

(i) Anson Principles of the English Law of Contracts

(ii) Pollock and Mulla Indian Contract Act

(Act IX of 1872) Students' Edition

Sale of Goods Act (Act III of 1930)

(iii) Indian Partnership Act, 1932

(iv) University Selection of Leading Cases

Paper III—The Law of Easements and Torts

(i) Underhill Torts

or

Ratan Lal Law of Torts

(ii) The Indian Easements Act (Act V of 1882)

(iii) Joti Prasad Law of Easements

(iv) Binode Behari Lal Law of Easements

(v) University Selection of Leading Cases

Paper IV—The Law of Evidence

(i) Ratan Lal Evidence Act

(ii) University Selection of Leading Cases

Paper V—Criminal Law and Procedure

* (i) Ratan Lal Indian Penal Code, Students Edition

(ii) Code of Criminal Procedure, excluding the Schedule and Chapters 33 34, 35, 43 44 A and 46

(iii) University Selection of Leading Cases

Paper VI—Constitutional Law

(i) Dicey On the Law of the Constitution (omitting the chapter on 'Droit Administratif' and the Appendices)

(ii) The Government of India Act, 1935 as adopted in 1947 (according to the Indian Provincial constitution order, 1947, omitting schedules,

*Candidates will not be required to have a knowledge of the amount of punishment which can be inflicted for any offence

Paper VII — Jurisprudence

Salmond Jurisprudence (omitting Appendices)

Final

The following Text books and Acts are recommended

Paper I — Civil Procedure and Limitation

- (i) The Code of Civil Procedure (omitting orders 27 28 35 36 37 45 46 8 49 and 51 of Schedule I)
- (ii) Mulla Commentary on the Civil Procedure Code (Students Edition)
- (iii) Walsh and Weir Pleadings in India

Or

Mooka The Law of Pleadings in British India

- (iv) The Indian Limitation Act (omitting the schedule)
The Indian Limitation Act (by Durga Prasad) is recommended for study

- (v) Arbitration Act No. of 1940

Paper II — The Law relating to Land Tenures Rent and Revenue (U P)

- (i) U P Tenancy Act No. XVII of 1939
- (ii) Benode Behari Lal Tenancy Law in the Provinces
- (iii) Act No. III of 1901 (United Province)

Or

The Law relating to Land Tenures Rent and Revenue (C P)

- (i) Central Provinces Tenancy Act of 1900
- (ii) Central Provinces Land Revenue Act of 1917
- (iii) University Selection of Leading Cases

Paper III — Hindu Law

- (i) Mulla Hindu Law
- (ii) University Selection of Leading Cases

Paper IV — Mohammedan Law

- (i) Wilson Digest of Anglo Mohammedan Law from the beginning of Part II to the end of the book
- (ii) Mulla Mohammedan Law
- (iii) Ka bi Prasad Muslim Law (Students Edition)
- (iv) University Selection of Leading Cases

Paper V — The Law relating to Transfer of Property etc

- (i) The Transfer of Property Act (Act IV of 1882)
- (ii) L G Mukerji Law of Transfer of Property
- (iii) University Selection of Leading Cases

Paper VI — Equity with special reference to Trusts and Specific Relief

- (i) The Indian Trusts Act (No. II of 1882)

(ii) The Specific Relief Act (No. I of 1877)

(iii) S G Bagchi Snells Principle of Equity

Chapters on the History and Maxims of Equity on Trusts, on Mistake, on Fraud—Actual and Constructive : e Chapters 1, 2, 3, 5, 6, 7, 8, 9, 22, 23 and 24

(iv) H P Bagchi and Durga Prasad The specific Relief Act

(v) University Selection or Leading Cases

Paper VII—Company Law and Income-Tax Law

(i) The Indian Companies Act, of 1913 with amendments upto date

(ii) The Indian Income Tax Act of 1922 with amendments upto date

Note,—Every Act mentioned in the above list should be understood to mean the Act with all subsequent amendments thereof

University Selection of Leading Cases

I—CONTRACTS

Henthorn v Fraser (1892), 2 Ch 27

Carlill v Macferson & Co 1893, (1 Q B, 256)

Mohri Bibee v Dharmoda Ghosh, 30, I A, 114 I. L R 30 Calcutta, 539

Lalman v, Gauri Dutt, 11 A L J P 489

Derry v Peck, 14 A, C 337 (Lord Herschell's judgment)

Jamal v Moola Dawood & Sons, 13 I A, 6, I L R, 13 Calcutta, 193

II—TORTS AND REMEDIES

Lloyd v Graco Smith & Co (1912), A C, 716 (Lord Macnaghten's judgment)

Butterfield v Forrester, 11 East 60 103 English Reports 926

Davies v Mann, 10 M and W 516 152 English Reports 586

Rylands v Fletcher L R 1 Exch 465

British Columbia P & Co v Loach A I P 1916 P C, 208

Bilbhadra Singh v Baidi Sahi, A I P 1926 P C, 46

Re Polemis, 111 K B 551

III—EVIDENCE

Ballishan Das v Iyengar I I P, 22 Allahabad 149

Sarat Chandra Das and others v Gopal Chandra Lohia and others, 29, Calcutta 296

Pakala v Emperor, A I R 1939 P C 47

Lal Chand v Mahant Parm Puri A I P 1926, P C, 9

IV—CRIMINAL LAW

P v Govinda I L J, 1 Bombay 2

Ganouri Lal v Q I, I I P 10 Calcutta 295

Amrita Lal Hazara v K F I I R 42 Calcutta 957

Q E v Moss A W N 1894 p 23

Mohd Husain v K F 15 Oudh Cases 321

Tapti Prasad K E L A L J R 590

V — C P RENT AND REVENUE LAWS

Pam Dayal v Enlabia Bai 4 N L R 120

Bhagwan Das v Cajadh r 23 N L R 9

VI — HINDU LAW

Hanooman Prasad Pandey v Babbee Munir Khanwar e 6 M I A 393

Raja Brij Narain Rai v Mangla Parsah Rai and others 51 I A 129
I L P 46 All 9.

Musammatt Gija Das v Sadasiv Dhundir and others 43 Cal 1031

Iri Dutta v Hansbutti 10 I A, 150 10 Cal 394

Krishna Murthi Ayyar v Krishana Murthi Ayyer A I R 1927 P C 139

Amrendra v Sanatan 60 J A 242

Arant v Shankar A I P 43 P C 196

VII — MOHAMMEDAN LAW

Gobind Dayal v Inayat Ullah I L R 7 All 775

Jafri Begam v Amir Mohammed Khan I L R 7 Allahabad 822

Habibur Rahman v Altaf Ali I L R 48 Calcutta 856 (P C)

Muhammad Junaid v Aulia Bihi I L R 42 All 497

Fakhr ud din v Kufayat ul lah (1910) 7 A L J R 1095

VIII — TRANSFER OF PROPERTY

Pem Pam v Kundan Lal 21 All 496 26 I A 68

Gokul Das Gojal Das v Puranmal Premsukhdas 10 Cal 1035 (P C)

Ramecoomar Koondoo v Jahan and Maria Mc Queen II Beng L R 46
(P C)

Webb v Macpherson I L R 31 Cal 57 (P C)

Raja Krishandatt Pam v Raja Mumtaz Ali Khan 5 Cal 108 (P C)

IX — EQUITY

Burn & Co v Mc Donald 30 Cal 34

Muscorie Bank Ltd v Albert Charles Raynoor 4 All

500 Nagorabala Das and another v Dinanath Mahish and others 51
Calcutta 299

Books recommended for Leading Cases—

Brij Nath Mithal University Selection of Leading Cases for Law Finals
(Gaya Prasad and Sons Agra)

Brij Nath Mithal University Selection of Leading Cases for Law
Previous (Gaya Prasad and Sons Agra)

LL M EXAMINATION—1919 & 1930

COMPULSORY SUBJECTS

- I Jurisprudence and Principles of Legislation —
 - Holland Jurisprudence
 - Salmond Jurisprudence
 - Green Theory of Political Obligations
 - Gray Nature and Sources of Law
 - Munn Ancient Law
 - Maine Early History of Institutions
 - Bentham Theory of Legislation
 - Dicey Law and Opinion of England
 - Laski Authority in the Modern State
 - J Brown Austinian Theory
 - J Brown Underlying Principles of Legislation
 - Clark Practical Jurisprudence
 - Holmes Common Law
 - Garner Introduction to Political Science
 - Maxwell Interpretation of Statutes
 - Joad Introduction to Modern Political Theory
- II Constitutional Law, British and Indian—
 - Anson Law and Customs of the Constitution
 - Medley English Constitutional History
 - Thomas Leading Cases in Constitutional Law
 - Marriot Mechanism of the Modern State
 - Archibald Outlines of Indian Constitutional History
 - Ridges Constitution
 - Mukerji Indian Constitution
 - Mukerji Indian Constitutional Documents
 - G N Singh Constitutional Development of India
 - Fredrick Whyte India—A Federation I
 - H D Hall The British Commonwealth of Nations
 - Sidney Law Governance of England
 - Committee on Federation
 - Davinson Report of the Round Table Conference
- III Roman Law—
 - Moyle Institutes of Law
 - Muirhead History of Roman Law
 - Sohn Institutes of Roman Law

Buckland Principles of Roman Private Law

Roby Introduction to the Digest

IV *Either (a) Hindu Law or (b) Mohammedan Law*

(a) Hindu Law—

Setlur Collection on law of Inheritance

Mayne Hindu Law

Sarkar Miman & Rules of Interpretation

Golab Chandra Shastri Hindu Law

Banerji Marriage and Stridhan

Sarkar Adoption

Sarvadikari Inheritance

Sen Hindu Jurisprudence

Dattala Chandrika and Dattaka Mimamsa translated by Ghosh

Itakshara Vyavahardhyaya translated by Gharpure

Ganapati Aiyer Law of Endowment

Yajnavalkya Smriti

Dayabhaga

(b) Mohammedan Law—

Wilson Anglo Mohammedan Law

Amir Ali Mohammedan Law

Sircar S C Mohammedan Law

Tyabji Mohammedan Law

Abdur Rahim Principles of Mohammedan Law

Jung Administration of Justice in Muslim Law

OPTIONAL SUBJECTS

Only two out of the following may be taken —

I *Either (a) Hindu Law or (b) Mohammedan Law* whichever is not taken is compulsory subject

(a) Hindu Law—as under compulsory subjects

(b) Mohammedan Law—as under compulsory subjects

II Law of Contracts—

Follock Law of Contracts

Street Foundation of Legal Liability Vol II

Smith Leading Cases on Law of Contract

Lowtad On Agency

Landley Partnership

Salmond Law of Contract

Mayn Damages (relevant portion)

Banerji Specific Reliefs

III Transfer of Immovable Property and Easements

Ghose On Mortgages

Williams Real Property

Tudor Cases on Real Property

Williams On Vendors and Purchasers

Mukerji On Perpetuities

Gale On Easements,

Peacock Law of Easements

IV Equity—

Story Equity, Jurisprudence

Underhill Trusts and Trustees

Lingdell Equity Jurisprudence

Binerji Specific Relief

White and Tudor Leading Cases on Equity

Kerr Injunction

Fry Specific Performance

V International Law, Public and Private—

(a) Public

Hall International Law

Oppenheim International Law

Pitt-Cibbett Leading Cases on International Law

(b) Private

Dicey Conflict of Law

Westlake Private International Law

VI Wills and Administration

Sen Gupta Indian Succession Act

Theobald Treatise on Law of Will

Williams Law of Executors and Administrators

Underhill and Strahan On Interpretation of Wills and Settlements

Note The candidates are advised to consult the *Lecture Notes* on the subjects pertaining to the prescribed course of study. Indian Acts pertaining to the subjects together with subsequent amendments up to six months preceding the date of examination should also be studied and the help of standard commentaries.

FACULTY OF MEDICINE

M B B S EXAMINATION—

First Examination for the Degree of M B B S

ADMISSION TO THE EXAMINATION

Candidates before presenting themselves for the First Examination shall produce certificates of—

(A) Having attended the following courses to the satisfaction of the Head of the College —

(i) Human Anatomy and Embryology

(a) A course of lectures and demonstrations on Human Anatomy including Embryology with special reference to their application to Medicine and Surgery extending over two years

(b) A course of dissections extending over two years The candidates must have dissected the whole body to the satisfaction of their teachers

(ii) Human Physiology

(a) A course of lectures and demonstrations on Physiology including Bio Chemistry and Bio-Physics extending over two years

(b) A practical course in Histology Experimental Physiology Bio Chemistry and Bio Physics extending over two years

(iii) Normal Psychology

A course of instruction in Elementary Normal Psychology

(iv) The normal reactions of the body to injury and infection as an introduction to General Pathology and Bacteriology *

(v) An introduction to Pharmacology *

(vi) Elements of the methods of clinical examination including the use of the common instruments and the examination of body fluids with demonstrations on both normal and abnormal living subjects *

A B — Courses in (iii) (ii) (v) and (vi) above be attended in the second academic year

(B) Having passed a test in (iv) (v) and (vi) above conducted by the College

The teaching of Anatomy and Physiology should include as a regular part of the course the demonstration on the living human body of structure and functions including the information to be obtained from Radiology

*The amount of time allotted to the study of these subjects shall not exceed three months

ANATOMY

A course of 100 lectures and 50 demonstrations on human anatomy, including Embryology with special reference to their application to Medicine and Surgery extending over two academic years

A course of dissection of the human body extending over two academic years

Systematic Course

(a) Lectures* and demonstrations dealing with the tissues and the various systems, such as Osteology, Myology, Syndesmology, Angiology, Neurology, Splanchnology, etc., of the human body

(b) Human Embryology

(i) General Embryology

The animal cell, cell-division, Germ cells fertilization of ovum, development of ovum, embryonic development, broad outlines of organogeny, intra uterine conditions, general growth

(ii) Special Embryology

Development of skull, development and morphology of upper and lower limbs, developmental positions in abdomen, development of heart, development of vascular systems, i.e. principal arteries and veins, inferior vena cava, lymphatic system, development of bronchial apparatus, development of spinal cord, development of encephalon, development of peripheral nervous system, development of the eye and the ear, development of the urogenital system, foetal circulation, changes at birth, development of digestive and respiratory systems

Practical Anatomy

Dissection of the whole human body in the course of two academic years

Regional Anatomy

Anatomical demonstration of various regions of the body with the help of recent dissections, model, radiographs and other preparations with special reference to the relations of the various structures and their surface anatomy

Radiographic Anatomy

Demonstrations of the forms, positions and movements of bones, joints and viscera in the living subject and the sites of ossification of various bones with the help of X ray

*Lectures should be demonstrated by x ray radiations, models, drawings, diagrams, radiographs, lantern slides and epidiascope

Applied Anatomy —

Demonstration of those points in the anatomy of human body which have a special reference to medicine and surgery such as Surface Anatomy and Surgical Anatomy of various parts of the body

Books recommended

CUNNINGHAM Text book of Anatomy

GRAY Text-book of Anatomy

BUCHANAN Text book Anatomy

CUNNINGHAM Practical Anatomy

ALEXANDER LEE and MCGREOR Surgical Anatomy

SIDDIQUI Atlas of Anatomy

WALMSLEY Manual of Practical Anatomy

FRASER Human Osteology

FRALER Embryology

**PHYSIOLOGY INCLUDING BIO CHEMISTRY AND
BIO PHYSICS**

*Physiology Theoretical —***A General Physiology**

A course of 100 lectures extending over two academic years

B Special Physiology (Bio Chemistry and Bio Physics)

A course of 40 lectures extending over two academic years

Physiology Practical —

- 1 A practical course in Histology (30 practical classes of two hours each one term each year)
- 2 A practical course in Experimental Physiology (30 practical classes of two hours each one term each year)
- 3 A practical course in Bio Chemistry and Bio Physics (30 practical classes of two hours each one term each year)

*Syllabus in Physiology***GENERAL PHYSIOLOGY —**

Theoretical Physiology of the whole human body including the knowledge of nutritional requirements needed to maintain the body in physiological equilibrium

SPECIAL PHYSIOLOGY—*Theoretical***I Elementary Chemistry of—**

- 1 Carbohydrates fats and proteins
- 2 Vitamins and hormones
- 3 Enzymes and their applications in digestion and absorption.
- 5 Body fluids of physiological importance

II Elementary composition of—

1 Common Foodstuffs

2 Body tissues

III Metabolism of food materials

IV Biological oxidation and reduction and tissue respiration

V Elementary study of Bio physics as related to Physiology

Practical —

A HISTOLOGY—

Microscopic study of the cells and tissues of the body both in fresh and fixed condition

B EXPERIMENTAL—

1 Apparatus in common use in experimental work

2 Simple experiments to illustrate the use of the above.

3 Simple experiments on muscle and nerve, *e.g.* effect of successive stimuli two or more, work of muscle, fatigue and conductivity in nerve and effect of temperatures etc.

4 Contraction without metals

5 Frog's heart—Automaticity, conductivity, effects of Heat and Cold, Heart Block, Stannius experiments, Latent period, Refractory period Stair case phenomenon, "All and none effect," and Cardiac nerves experiments

6 Action of the following drugs on heart —

Nicotine, Pilocarpine Adrenaline Atropine and Acetylcholine

Books recommended

HALLIBURTON Handbook of Physiology and Biochemistry

HALLIBURTON Essentials of Chemical Physiology

SCHAFFER Essentials of Histology

SCHAFFER Essentials of Experimental Physiology

Recommended for reference

WRIGHT Applied Physiology

BURRIDGE Excitability, a Cardiac Study

BURRIDGE A New Physiology of Sensation

BURRIDGE A New Physiological Psychology

BURRIDGE Alcohol and Anaesthesia.

C BIO CHEMISTRY AND BIO PHYSICS —

- 1 Qualitative method of detection of Carbohydrates Fats and proteins
- 2 Quantitative estimation of substances of Physiological importance —
Reducing sugar proteins chlorides and phosphates
- 3 Action of digestive enzymes and bile salts
- 4 Qualitative tests and quantitative examinations of the important constituents of normal and Pathological urine
- 5 Detection and estimation of important constituents of blood
Use of spectroscope
- 6 Qualitative tests of vitamins
- 7 Analysis of important food stuffs

Demonstration —

- 1 PH of Physiological fluids and urine
- 2 Use of calorimeter B M R apparatus Gas analysis apparatus
Polarimeter and Viscometer
- 3 Determination of blood sugar serum calcium plasma chloride and blood urea
- 4 Determination of alkali reserve and blood gases
- 5 Function tests —Liver kidney and Pancreas
- 6 Gastric analysis

Books suggested—*Literature*

Cameron —Text book of Bio chemistry (Churchill)

W V Thorpe Bio-chemistry for Medical Students (Churchill)

Practical —

Cameron and White A course in Practical Bio chemistry for Students of Biology and Medicine (Churchill)

HEWITT AND ROBSON The Essentials of Chemical Physiology by Haliburton (Longmans Green)

Second Examination for the Degree of M B B S

ADMISSION TO THE EXAMINATION

Before admission to the Second Examination candidates shall present certificates of having completely attended the following courses to the satisfaction of the Head of the College —

In Pharmacology including Elementary Pharmacological Chemistry and Materia Medica—

A course of lectures and demonstrations extending over one year

In Practical Pharmacy—

A course of demonstrations and practical work, extending over one year

PHARMACOLOGY, INCLUDING MATERIA MEDICA
PHARMACY AND PHARMACOLOGICAL
THERAPEUTICS

A course of lectures and demonstrations extending over one academic year and consisting of—

- (1) 50 lectures in Pharmacology and Pharmacological Therapeutics
- (2) 15 demonstrations in experimental pharmacology
- (3) 30 demonstrations in Materia Medica and Pharmacy

Syllabus in Pharmacology

1 50 lectures on the following for one academic year

1 Definition—Scope and relation of pharmacology to sister sciences
Definition of drugs Pharmacopoeia Standards (including international standards) Biological and chemical Assay of drugs

Definitions of the following Pharmacy Therapeutics Rational and Empirical treatment Toxicology

2 Active principles of drugs and their chemical nature

Chemistry (applied) of common drugs such as cardiac glucosides Cinchona and other synthetic anti-malarials, opium derivatives Belladonna group Cocaine and its substitutes (used as local anaesthetics), Sympathomimetic compounds (Adrenaline and related compounds), Chemotherapeutic remedies (especially the sulphonamide group), saponins resins volatile oils, terpenes

Relations of chemical structure to physiological actions of common drugs such as adrenaline and Cocaine group of drugs

3 Posology Factors modifying dosage Modes of action of drugs (Cumulation Synergism Potentiation Antagonism, Tolerance Idiosyncrasy Addiction Methods (modes) or channels of administration of drugs Fate of drugs in the body Absorption distribution of drugs in the tissues of the body Mechanism of destruction (detoxication) of drugs in the body channels of excretion of drugs

Salt and ionic action of drugs Physical processes in connection with absorption of drugs

4 Pharmacology and medicinal uses (Therapeutics) of Acids Alkaloids and Metal of Alkaline Earth, Heavy metals volatile oils etc. Nutrients Alternatives Antiseptics and Disinfectants Chemotherapeutic remedies Anthelmintics Parasitic Gland products Sex hormones Dietetic treatments Radiation Therapy

Detailed action of drugs with medical uses on the Nervous Cardiovascular Respiratory Digestive Genitourinary systems on blood and blood forming organs Metabolism heat regulation Metabolism of the body skin (counter irritants Sedatives etc)

Books recommended

CUSHNY Pharmacology

DIXON Pharmacology

CLARK Applied Pharmacology

WHITLA Materia Medica (edited by Burn)

GUOSH Materia Medica

MAJUMDAR Pharmacology

HALE WHITE Materia Medica

II *Demonstration in Experimental Pharmacology*

There shall be 12 demonstrations which will include

1 Anaesthetics used for experimental animals

Apparatus and instruments (common ones) used for experimental work

Preparation of an animal—Preparation of decerebrate and spinal cats (explaining the ideas underlying such preparations to)

2 Action of common drugs on blood pressure (in different preparations)

3 Action of drugs on blood pressure and respiration

4 Action of drugs on heart (in intact animals)

5 Action of drugs on heart (isolated)

6 Perfusion of vessels (Vaso constrictors and dilators)

7 Action of drug on intestinal and spleen volume (intact animals)

8 Action of drugs on intestinal movements (intact animals)

9 Action of drugs on isolated loops of intestine

10 Action of drugs on uterine movement (intact animals)

11 Action of drugs on uterine movement (isolated)

12 Special experiments as—

(i) Vaso motor reversal of Dale

(ii) Potentiation experiment

(iii) Actions of acetyl choline

(iv) Actions of Nicotine in different preparations

13a *Examination Experimental Pharmacology*

(1) Students will be asked to explain the use of common apparatus used in experimental work

(2) Student will also be asked to explain curves showing the actions of drugs and they will be asked to draw curves showing the effects of drug on the blood pressure respiration etc

Books recommended

JACKSON Experimental Pharmacology

SOLLMAN AND HANZIK Experimental Pharmacology

III *Demonstrations in Materia Medica, Pharmacy (Dispensing) and Prescription writing*

There shall be 30 lectures on the following —

A Materia Medica will include

- (i) Demonstration of specimens of crude drugs
- (ii) Preparations, dosages, compositions of important and commonly used B P preparations

B Pharmacy Practical will include

- (i) Mixtures
- (ii) Pills
- (iii) Emulsions
- (iv) Lotions
- (v) Emplastra
- (vi) Unguenta
- (vii) Suppositories
- (viii) Effervescent powders (and mixtures)

C Incompatibilities (Physical Chemical and Physiological) in prescriptions

D Prescription writing of common diseases

Final Examination for the Degree of M B, B S

ADMISSION TO THE EXAMINATION

Before admission to the Final M B B S Part I or Part II Examination candidates shall present certificates of having satisfactorily attended the following courses to the satisfaction of the Head of the College

PART I

2 *Hygiene and Public Health*

A course of 36 lectures in preventive medicine and demonstration on Hygiene Food and dietaries

3 *Medical Jurisprudence and Toxicology**Medical Jurisprudence*

(a) A course of 36 lectures in Forensic Medicine and Toxicology, including 10 demonstrations

(b) The candidate will be required to produce a certificate of having attended six *chemical* Lectures

PART II

I Medicine

(a) A course of lectures and clinical demonstrations in Medicine including Diseases of Infancy and Child hood extending over two years

Note —The course of instruction in Medicine shall include the practice of Clinical Pathology and laboratory methods and the application of Physiology and Anatomy to the investigation of diseases

(b) A medical clinical clerkship for a period of nine months of which six months must be spent in the hospital wards and three months in the out patient department

(c) Clinical clerkship for not less than one month in a children's ward or hospital or in a children's out patient department

Note —During the period of medical ward clerking candidates must have been in residence in hospital or close by for a period of one month as intern clerks

(d) Instruction in Therapeutics and Prescribing including (i) pharmacological therapeutics (ii) the methods of treatment by vaccines and sera (iii) physiotherapy (iv) Dietetics and (v) the principles of nursing

(e) Every candidate shall also present evidence of having received instruction in the following subjects —

(i) Fevers This course must be taken at a recognised Infectious Diseases Hospital for a period of three months

(ii) Tuberculosis

(iii) Dermatology

(iv) Practical instruction in Vaccination from one of the authorised Vaccinators

Note —Throughout the whole period of instruction in Medicine importance of the preventive aspects of the subject shall be emphasised

Note —The appointments mentioned in sub clauses (b) and (c) under the head (I) Medicine above and (b) and (d) under the head (II) Surgery later may be concurrent

II Surgery

(a) A course of lectures and clinical demonstrations in Surgery including diseases of infancy and childhood extending over two years

Note —The course of instruction in Surgery shall include instruction in Surgical Pathology and the application of Physiology and Anatomy to the investigation of diseases

(b) A Surgical dressership for a period of nine months of which six months must be spent in the hospital wards and three months in the out patient department

Note —During the period of surgical ward dressership candidates must have been in residence in hospital or close by for a period of one month as intern clerks

(c) A course of practical instruction in Operative Surgery, including operations on the cadaver to be performed by the students themselves, extending over a period of one term

(d) Practical instruction in minor surgery on the living

(e) Practical instruction in Surgical methods including Physiotherapy

(f) Every candidate shall also present evidence of having received adequate instruction in the following subjects —

(i) Administration of Anaesthetics (Candidates shall be required to produce a certificate of having administered Anaesthetics on, at least ten occasions)

(ii) Dental Surgery

(iii) Radiology and Electro-therapeutics in their application to Surgery

(iv) Venereal Diseases

(v) Diseases of Ear, Nose and Throat, including the use of the Otoscope, Laryngoscope and Rhinoscope

(vi) Orthopaedics

NOTE — *Throughout the whole period of instruction on Surgery, importance of the preventive aspects of the subject shall be emphasised*

III Obstetrics and Gynaecology

(a) A course of lectures and clinical demonstrations, extending over one year in Midwifery, Gynaecology and Hygiene of the New born. The course of instruction in Midwifery shall include Applied Anatomy and Physiology of Pregnancy and labour

(b) An appointment for six months as a clinical Clerk in Maternity and Gynaecological departments during which period candidates must have attended twenty labour cases in a recognised Maternity Hospital or in the lying in wards of a General Hospital under the supervision of a qualified member of the Medical staff. They shall have also attended during this period Gynaecological out-patients and antenatal clinics at recognised institutions

NOTE 1 — *During the period of clinical clerkship candidate must have been in residence in hospital or closely for a continuous period of three months as intern clerk*

NOTE 2 — *A certificate showing the number of cases of labour attended by the candidates in the Maternity hospital should be signed by a responsible Medical Officer of the Hospital and submitted*

(i) The certificate shall be submitted to the Maternity Hospital and the certificate shall be submitted to the Maternity Hospital and the certificate shall be submitted to the Maternity Hospital

- (ii) That satisfactory written histories of the cases attended by the candidates were presented to the supervising officer and the counter signed by him
- (iii) That the candidates have attended the antenatal out patient department and have written out at least 20 cases in an antenatal case book certified by a responsible Medical Officer on the staff of the hospital

IV Ophthalmology

- (a) A course of 20 lectures and 25 demonstrations on refraction and use of ophthalmoscope
- (b) An attendance for three months in the Ophthalmic Out Patient department and wards of a recognised hospital

V Pathology

- (a) A course of lectures demonstrations practical work in Pathology extending over two years
- (b) A course of lectures demonstrations and practical work in Bacteriology and Elementary Parasitology extending over two years
- (c) A course of instruction in Chemical Pathology and in Clinical Pathology and Bacteriology
- (d) A certificate of having performed at least ten autopsies as a post mortem clerk

The candidates will be required to submit to the examiners full records of ten autopsies which they have attended and which have been certified by the teachers in that subject

Final M B B S (Part I) Examination

1 PATHOLOGY AND BACTERIOLOGY

A course of instruction extending through two academic years (3rd and 4th year of the medical curriculum) in Pathology Bacteriology and Parasitology with lectures not less than 100 and with practical classes extending over the same period in Morbid Histology Bacteriology Parasitology Medical Entomology and Clinical Pathology

Each student will be required to have acted as a post mortem clerk in at least 10 autopsies as far as it may be practicable

A course of 12 lectures in Elementary Pathology and Bacteriology will be given to students in their pre clinical period

General Pathology

1 General considerations Introduction Definition and scope of Pathology Health and Disease Heredity Malformation Tissue death Causes of disease

2 Degenerations

- 3 Disturbances of Nutrition, Progressive and Retrogressive changes
- 4 Disturbances of Circulation Thrombosis Embolism and infarction, Oedema and dropsy
- 5 Inflammation and response of tissue
- 6 Tumours
- 7 Infection and immunity Allergy and hypersensitiveness
- 8 Fever and Pyrexia
- 9 Shock and collapse

Special Pathology

- 1 Deficiency and metabolic diseases
- 2 Diseases of the digestive system (with liver and pancreas)
- 3 Diseases of the respiratory system
- 4 Diseases of the urinary system
- 5 Diseases of the reticulo endothelial system (spleen, lymph glands and bone marrow)
- 6 Anaemias
- 7 Diseases of the cardio-vascular system
- 8 Diseases of the ductless glands
- 9 Diseases of the nervous system
- 10 Diseases of the locomotor system
- 11 Diseases of the Reproductive system

Practical Class

Practical classes with lecture demonstrations in—

- 1 Clinical Pathology—Examination of sputum stool urine cerebro-spinal fluid, serous fluids etc Haematology, blood count, total and differential and its significance haemoglobin, percentage, blood grouping, Wintrobe count other common techniques.
- 2 Morbid anatomy and histology—Staining and study of tissue sections
- 3 Chemical Pathology Demonstrations in blood urea blood sugar Van den Bergh test, gastric contents, etc

Bacteriology

- 1 Introduction and classification of bacteria
- 2 General biology of bacteria
- 3 Method of sterilisation and preparation of culture media
- 4 The problem of speciation
- 5 Morphological biological and cultural characteristics of the organisms with their pathogenicity in relation to man along with the methods of laboratory diagnosis of the diseases caused by them e.g. Coli Bacilli Spirilla Streptococcus Group Yeast and Pathogenic fungi
- 6 Filterable viruses

Practical

Practical instructions on—

- 1 Bacteriological techniques
- 2 Culture media
- 3 Staining methods
- 4 Principal pathogenic micro organisms

Medical Parasitology

A course of lectures in Medical Protozoology Helminthology and Entomology with practical instructions on it especially in relation to the common protozoa and insects of the tropics

Books recommended

Green Text book of Pathology

Boyd Text book of Pathology

De and Chatterji Text book of Bacteriology

Muir and Lithke Bacteriology

Panton and Morris Chemical Pathology

Price Text-book of Medicine

Man on Tropical Diseases

2 HYGIENE AND PUBLIC HEALTH

1 One course of 36 lectures and 8 demonstrations on hygiene in the 4th year Personal hygiene Food and dietaries the constructions of the dwelling houses with reference to (a) the proper access of sunlight and air (b) methods of natural and artificial ventilation warming and water supply (c) the disposal of refuse and excretal matters The effect on health of overcrowding vitiated air occupation and offensive trade

Effects on health of impure water polluted soil and unsound or infected food

The inspection of meat grain and other foodstuffs

Climatology and Meteorology

The aetiology and prevention of endemic and epidemic diseases with special reference to Indian climate The methodical investigation of cases of such diseases with reference to their causation The relation to human diseases of the common diseases and parasites of other forms of life animal or vegetable

Control of tuberculosis and of leprosy

The general principles and method of vaccination preventive inoculation, isolation and disinfection

Elements of vital statistics correct certification of causes of death

Causes and prevention of infant mortality with special reference to welfare work in rural and urban areas in this and other countries

The principles of school hygiene and medical examination of school children

Principles and practice of rural sanitation especially under Indian conditions

Sanitary arrangements at fairs

The obligations of medical practitioners as required by the laws relating to public health

The role of fixed and travelling dispensaries in controlling sickness in rural areas

2 Demonstration each of two hours 4 may be out door demonstrations and 4 may be given in the museum The out-door demonstrations may include

- (1) Filtration of water (visit to water works)
- (2) Sewerage system
- (3) Maternity and child welfare (visit to a Child Welfare centre)
- (4) School hygiene and medical examination of school children (visit to school)
- (5) Visit to rural development area or such other demonstrations as convenient

3 A course in theory and practice of anti small pox Vaccination including 2 attendances of two hours each

Note — In the teaching of hygiene emphasis should be laid on the principles of preventive medicine

Books recommended

NOTT and LUTH Hygiene

MODI Elements of Hygiene and Public Health

DUNN and PANDYA Indian Hygiene and Public Health

3 MEDICAL JURISPRUDENCE AND TOXICOLOGY

A course of 50 lectures and 10 demonstrations in the Fourth Year

1 Medical Jurisprudence

- (a) Legal procedure at inquest, Criminal Courts and their power, Medical evidence, Medico legal reports, Dying declaration, Medical witness and his examination (evidence) in Courts
- (b) Identity of the living and dead Determination of race, sex, age and their medico legal aspect Antropometry Features Deformities Scars Identifying marks Occupation Marks, etc.
- (c) Medico-legal aspects of the examination of a dead body and the suspended and mutilated body of its fragments skeleton and the Examination of a dead body and its surroundings, etc.
- (d) Examination of blood stains, criminal hair hairs, etc. clothing, etc.

- (e) Modes of death Natural causes of sudden death signs of death Time of death presumption of death Presumption of survivorship
- (f) Violent deaths from asphyxia hanging strangulation and throttling suffocation and drowning
- (g) Death from starvation cold heat burns electricity and lightning
- (h) Mechanical injuries and their medico legal aspect in relation to accident suicide and homicide Distinction between injuries caused during life and after death Medico legal examination of an injured person Regional injuries
- (i) Impotence and sterility Virginity Pregnancy and Delivery in relation to suits of nullity of marriage divorce defamation legitimacy affiliation cases etc
- (j) Sexual offences Rape Unnatural offence Bestiality including certain abnormal sexual perversions
- (k) Miscarriage criminal and justifiable Law in relation to criminal miscarriage Duty of a physician when called on to treat a case of criminal miscarriage Infanticide
- (l) Medico legal aspect of insanity as regards civil and criminal responsibility and rules regarding the admission and treatment of insane person into Mental hospitals according to Lunacy Act of India Figned insanity Malingering
- (m) Law and Ethics in the conduct of medical practice Certificates Infamous conduct Professional secrets Privileged Communication Malpraxis

- Toxicology

- (a) General considerations regarding the sale of poisons with reference to the Poisons Act of 1913 and the Dangerous Drugs Act Classification of poisons action of poisons and its modifications Diagnosis treatment *post mortem* appearance and analysis of poisons Rules regarding the preservation and transmission of viscera and other suspected articles for chemical analysis in cases of suspected poisoning Duty of the physician in cases of suspected poisoning
- (b) Detailed study of the poisons commonly used in India as regards their signs treatment *post mortem* appearance and medico legal question The chief of these are as follows—Sulphuric acid Nitric acid Hydrochloric acid Oxalic and Carbolic acid Lysol Caustic alkalis arsenic antimony mercury Copper Lead Zinc

and their salts, Castor oil seeds, *Abius pectoriosus* *Samocarpus anacardium* *Calotropis gigantea*, *plumbago rosea*, and *zeylanica*, *Cantharides*, Poisonous snakes *Scorpions* Bees, etc., Poisonous foods, Poisonous fungi Mechanical irritants such as glass, diamond, hair etc opium, Alcohol Ether Chloroform Chloral hydrate, Veronal (Barbituric acid products), Kerosene oil petrol, Dhatura, Belladonna (Atropine group) *Cannabis indica*, Cocaine, Strychnos *Nux vomica*, Tobacco *Nerium odorum*, *Cerbera thevetia* (Yellow oleander seeds), *Aconite* root Hydrocyanic acid Potassium and Mercuric cyanides, Carbon monoxide Carbon dioxide Sewer air, Laughing gas, Poisonous War gases

- (c) Attendance—At least 10 medico legal *post mortem* examinations
The candidates are required to write six medico legal *post-mortem* reports which may be inspected by the examiners

Books recommended

MODY Text book of Jurisprudence and Toxicology (Butterworth),

LYON Medical Jurisprudence

TAYLOR Medical Jurisprudence

GLOISTER Medical Jurisprudence

LAMBERT Post mortems in India

Final M. B., B. S. (Part II) Examination

I MEDICINE

1 A course of not less than 100 lectures on the principles and practice of medicine

2 A course of not less than 50 lectures or demonstrations on clinical medicine and attendance on general inpatient and outpatient practice during at least two years which may run concurrently with surgical practice

3 A course of medical practice in a recognised hospital during three years of clinical study with clinical instruction and experience as a medical clerk for not less than nine months

(a) three months of this period of medical clinical clerkship to be spent in the medical out-patient department

(b) six months of the period to be spent in medical wards of the hospital with not less than twelve continuous months in charge

(c) One month of the period of medical ward clerkship to be spent as Intern clerk during which the student must be in charge of the hospital or close by

4 Instruction in Therapeutics and procedures including (i) Physical Therapeutics (ii) Medical treatment of the patient (iii) Physiotherapy, (iv) Dietetics and (v) the treatment of the patient

7. A course of not less than 20 demonstrations of clinical recognition and interpretation of physical signs and the use of observation

8. Instruction in Applied Anatomy and Physiology and (to be) throughout the period of clinical studies

9. Instruction in the following subjects —

- (a) Medical diseases of children—10 lectures and 6 weeks attendance at children's out patient department or ward
- (b) Acute infectious diseases—10 lectures and 6 weeks attendance at hospital for infectious diseases
- (c) Tuberculosis—10 lectures and 6 weeks attendance at Tuberculosis Wards of hospital clinic
- (d) Diseases of the skin including Leprosy—10 lectures and 6 weeks attendance at out patient clinic for skin diseases
- (e) Mental diseases—9 lectures and 9 clinical demonstrations at a mental hospital

Syllabus for Mental Diseases

1. Behaviour—Normal and abnormal suggestion suggestion sublimation inferiority feeling delusion illusion hallucination phantasy
2. Psychopathology
3. Classification—General Symptomatology
4. Principal types of mental disorders —
 - (a) Failure of mental development
Idiocy Imbecility feeble mindedness Moral imbecility
 - (b) Mania Melancholia Stupor Manic depressive psychosis alternating and circular Insanity
 - (c) Chronic systematized delusional insanity [paranoia]
 - (d) Parasyphilis —general paralysis of the insane Schizophrenia Dementia—Secondary and senile
 - (e) Confusional psychosis Toxic insanity Exhaustion psychosis from privation or post febrile
Puerperal insanity
 - (f) Epileptic insanity
 - (g) Psycho neuroses —
Neuroasthenia Hysteria Psychasthenia
Anxiety state
5. Medico-legal aspect of insanity
Feigned insanity Law and mental disorder
Admission into Mental hospital
Certification

necessary abdominal and other examinations under the supervision of the certifying officer

- [c] That satisfactorily written histories of the cases attended by the candidate were presented to the supervising officer and countersigned by him
- [d] That the candidate has attended Ante natal Out patient Department and has written out at least 20 cases in the Ante natal case book certified by a responsible medical officer and the staff of the hospital

Books recommended

Tarb Airn Gynæcology with Obstetrics

Ten Teachers Gynæcology

Johnson Midwifery

Eden and Lockyers Gynæcology for students and Practitioners

Eden and Holland Midwifery

unro Kerr Midwifery and Gynæcology

4 OPHTHALMOLOGY

1 A course of 25 lectures on diseases of the eye

2 A course of 25 demonstrations in refraction and on the use of the ophthalmoscope and other ophthalmic instruments

3 An attendance for two months in the ophthalmic out patient department

4 An attendance for one month as ophthalmic clerk in the ophthalmic ward.

Books recommended

May and Worth Diseases of the eye

Parsons Diseases of the eye

BACHELOR OF ENGINEERING

SYLLABUS

First Year Class

Pure Mathematics

There will be two papers, Paper I will include Analytical and Graphical Algebra, Trigonometry and Co ordinate Geometry Paper II will include Elements of Differential and Integral Calculus

Algebra — Quadratic equations and expression, Simultaneous quadratic equations, Progression Binomial theorem, Exponential theorem and Logarithmic series, Partial fractions, Complex quantities

Graphic representation of the algebraic trigonometric and logarithmic functions with application to solution of equations and questions of interpolation Simpson's rule for areas with geometric and physical applications, Integral curves

Trigonometry — Trigonometrical formulae with application Identities and Trigonometrical equations Graphs of Trigonometrical Ratios Logarithmic sines, cosines etc Application of logarithms to arithmetical and Trigonometrical calculation Solution of Triangles, Height and Distance, Inverse circular functions

De Moivre's theorem and its application, Hyperbolic functions

Geometry — Circle, Parabola Ellipse, Hyperbola, their equations and properties, Tracing of commonly occurring curve, Cartesian co-ordinates in space Direction cosines of a line Equations of a plane, straight line, cylinder, cone and ellipsoid, Straight line in space and its equation Projecting planes of a line

Differential calculus — Functions, limits and continuity The differential coefficients general rules of differentiation Standard form Geometrical and mechanical illustrations Tangents normals subtangents, subnormals Convexity concavity, points of inflexion Curvature, radius and centre of curvature Involute and evolute Asymptotes Maxima and minima of function of one independent variable Rates and probable errors

Integral Calculus — Methods of integration Standard forms Integration by parts and by substitution Definite and indefinite integrals Arcs Length of curve Surface and volumes of solid of revolution Centre of gravity The Theorem of Pappus and Guldinus Second Moment of plane figures Approximate integration and Simpson's rule Applications to engineering problems

Applied Physics

Heat — Measurement of temperatures, gas thermometer, Specific heats, change of state and latent heat Mechanical equivalent of heat

Kinetic theory of gas liquefaction of gases viscosity and surface tension Conductions convection and radiation Pyrometry Laws of thermo dynamic Carnot's cycle Entropy Absolute scale of temperature

Light—Thick and thin lenses Mirrors Nodal points eye pieces spherical and chromatic aberration Telescopes Microscopes Sextant Photometers Wave theory of light laws of reflection refraction diffraction of light Diffraction grating Interference of light Newton's Rays Spectroscopes Measurement of wave length of light Polarisation of light—Polarimeter

Acoustics—Velocity frequency intensity and quality of sound

Progressive and standing waves Resonance and beats Sound ranging Hydrophones Microphones and loud speakers Fourier's theorem Acoustics of buildings

Magnetism—Molecular theory of magnetism vibration magnetometers earth's magnetism magnetic properties of materials Susceptibility and permeability Hysteresis magnetic flux reluctance and magnetomotive force with reference to magnetic materials used in Engineering practice Electro magnetics

Electricity—General principles of electrostatics Potential capacity of condensers Dielectric constant Electrometer Primary and secondary cells Magnetic effects of current Galvanometers Direct current generators Alternators Measurement of current voltage and power Measurement of resistance Post office Box Carey Foster's Bridge Potentiometer Thermo-electricity Electromagnetic induction Inductance Transformer Eddy current Cathode rays X rays Radio activity Electromagnetic waves

Applied Chemistry

(Technical Chemistry and Engineering Metallurgy)

Properties of gases vapours and liquids Deviation of gases from the perfect gas laws

Solid liquid and gaseous fuels Indian coals coal distillation its product and their utilization sampling and analysis of fuels

Combustion—Calculation of volumes and weights of air necessary for combustion of fuel Heat losses—Combustion of flue gas

Chemistry of Boiler water Boiler scales corrosion of plates softening of boiler water sterilization and filtration

Lubrication Lubricants Tests

Brief study of the manufacture and properties with special reference to their use in engineering of the common non ferrous metals and their alloys cast iron wrought iron and steel The influence of impurities upon

metal and alloys The alloy steels The crystalline structure of metals with special reference to their mechanical properties The effect of mechanical work on metals Fracture of metals and their crystalline structures Crystallisation and fatigue of metals Brief study of Phase Rule and equilibrium diagrams with special reference to metals and alloys Iron-carbon system Hardening, tempering annealing and normalising of steel Case hardening of steel Corrosion of iron and steel methods of preventing corrosion

Applied Mathematics

Vectors and scalars, their addition, subtraction and multiplication Mechanics treated from the vector point of view Units and dimensions of mass, momentum, force impulse, work energy power

Uniplanar forces treated both analytically and graphically general conditions of equilibrium Friction and its application in simple cases of machines, Work Power H P centre of gravity, Stable, unstable and neutral equilibrium

Displacements—linear, angular and relative velocities and accelerations diagrams of these quantities plotted to time and space, Uniform circular motion, motion in a vertical circle simple Harmonic motion simple and conical pendulums

Fluid pressure, resultant fluid force on vertical plane area on one or both sides Buoyancy Centre of pressure on a surface immersed in fluid Floating bodies Metacentre

Applied Mechanics

Elementary principles and applications of linear and angular motions Principle of work and its applications Power and energy Elements of the transmission of power

Simple balancing Governors Friction in machine elements, Theory of simple machines Brakes, clutches &c

Applications of hydrostatics Simple consideration of fluid flow

Forces Moments Couples Conditions of equilibrium and their applications Elements of graphic statics

Elements of the strength and elasticity of materials Lame's modulus Simple treatment of strength and stiffness of rods, beams and shafts Bending moment and shearing force diagrams and their uses Bending stresses Elementary ideas about Combined bending and direct stress Preliminary consideration of properties and uses of materials

Surveying

Scales Key to traverse friction Construction of plan dia gonal and vernier scale

Chain surveying Measurement of distances Hundred feet chain and Gunter's chain Standardisation of chains Measuring lines on level and sloping ground Obstacles Conventional sign Sources of error in chaining and their correction Accuracy of linear measurements

Methods of carrying out a chain survey Hand sketch Finding the direction of meridian Station points Tie lines and check lines Offsets Cross staff Optical square Field book Entry in field book Scale of plan Plotting Calculation of areas

Compass surveying Magnetic north and true north Bearing Traversing with prismatic and surveying compass Adjustments of a compass Method of surveying with a compass in the presence of iron Method of booking and plotting Closing error and its adjustment Finding one's place Magnetic variation and its importance in land survey

Levelling Object of levelling Description use and adjustments of a dumpy level Levelling staff Method of observation Daculum Bench mark Reduced levels Level surface and horizontal plane Effects of curvature and refraction Different classes of levelling Levelling field book Method of booking and plotting Care of instruments Precautions necessary to ensure accuracy in levelling Contour lines Methods of contouring

Theodolite survey Description use and adjustments of a transit theodolite Measurement of horizontal and vertical angles Taking magnetic bearings with a theodolite Method of traversing by inward angles Limit of error in traversing Gale's traverse system of plotting Conditions of a closed traverse Closing error and its correction

Plane-tableing The plane table equipment Method of plane tableing Finding one's place Triangle of error Geometrical and trigonometrical methods

Curves—Laying out railway curves Chord and offset method Theodolite method Useful Problems

Field work and plotting

Building Materials and Building Construction

Stores—Source and characteristics of useful Indian stones

Bricks and tiles Brick earth Manufacture and classification of brick Selection and testing of bricks Fire bricks Tiles

Lime and cement composition and manufacture Mortar its preparation and use Setting of mortar Testing and specification Concrete

lattice
Timber Indian timber Sources and suitability for different

purposes Natural and artificial seasoning Defects and decay Preserva-
tion Fireproofing

Metals in building construction Their market forms Protection
against corrosion

Miscellaneous — Asphalt Paints, Varnish putty Glue Size White-
wash and distemper, Coal-tar, Glass

Brickwork General principles and precautions Bonds Racking
back

Masonry Different kinds of masonry Methods of strengthening
Joints Dowels, joggles and cramps Methods of hoisting stones, the
Lewis bolt

Elementary principles of reinforced brickwork and reinforced
concrete

Foundations Bearing pressure on soils Breadth of foundations
Benching out Piles and driving Shoring and underpinning Foundations
on different sub-soils Well foundations Depth of foundations

Fixing of machinery Vibration and its prevention Methods of
isolating machinery

Walls Thickness Plinth Buttresses Plasters Openings for
doors and windows Damp proof courses Plastering and pointing,

Brick and masonry arches — different forms Practical construction
of arches

Staircases Types Positions Width of tread and height of riser
Balustrades and hand rails

Floors and ceilings of different types Damp-proof floors Protection
against white ants

Pent roofs Wood and iron roof trusses Flat roofs Gutters and
spouts

Erection of brick chimneys

Sanitation of buildings Lighting Ventilation Sky lights Water
supply Refuse disposal Municipal laws

Machine Drawing

First angle projections Third angle projection Sections Auxiliary
views Intersections Interpenetrations Pictorial Projections

Conventional representation of machine details Dimensioning, and
printing

Rivets and rivetted joints Bolts and belted joints Screw thread
and screwed fastenings Methods of bolting a nut Keys and cotter
pins and pin joints Expansion joints Shafts and shaft couplings
Plummer blocks Brackets and hangers Pulleys Lubricators

Engine cylinders Cylinder covers Stuffing boxes Slide valves
Piston valve Valve rods Piston Pin rods Cross head Connect-
ing rods Crank shaft Mountings Feeders Fly wheels

Boiler mounting Safety valve Feed check valves Safety valves
Blow off-cocks

Simple designs Shafting and shaft coupling Bearings Key and cottered joint Knuckle joints Rivets and riveted joints Pipes and pipe joints Cylinder covers and studs stuffing boxes

Finish d working drawings Students are expected to prepare both from their own sketches and blue prints a set of working drawings of as many examples as possible of the above details. All drawings must be neatly and accurately drawn in pencil and fully dimensioned

Sketch book Sketches must be entirely freehand except circles. Drawings from sketches will not be considered if the corresponding sketches are not found together with other necessary particulars in the student's own sketch book and note book.

Practical Geometry and Graphic Statics

Projections of lines planes and solids

Projections and sections of prisms pyramids cylinders cones with their axes inclined and also with alteration of ground line

Intersections and interpenetrations of cylinders and cones. Intersections of flat and curved surfaces

Developments of surfaces of cylinders cones and of various solids

Isometric and oblique projections of rectangular boxes and geometrical solids such as cones cylinders and carpentry joints

Graphical representation of forces The link polygon and its application in finding the resultant of a given system of forces and finding unknown forces Graphical representation of moments and couples

Force diagrams for simple roof trusses lattice girders and cranes

Bending moment and shearing force diagrams for simply supported beams and for cantilevers

Second Year Class

(1) Pure Mathematics

Algebra and Trigonometry — Partial fractions Complex quantities and their graphical representation Rules for Addition and Multiplication of Vector quantities De Moivre's Theorem and application Hyperbolic Functions Simple test of the Convergence and Divergence of Series

Co-ordinate Geometry — Position of a point in space Direction cosines of a line Equation of a Plane Straight line Cylinder Cone and Ellipsoid in simplest form

Differential Calculus — Successive Differentiation Theorem of Leibnitz Expansions Taylor's and Maclaurin's Theorems Partial Differentiation

Asymptotes, Evolutes, Envelopes, Maxima and Minima of two independent variables. Evaluation of Indeterminate forms. Elements of Curve tracing referring to rectangular and polar Co-ordinates. Equation and Properties of the cycloid, Epit and Hypocycloids the Catenary and Spirals. Application to Engineering problems.

Integral Calculus—Methods of substitution. Integration by parts. Integration of Rational Algebraic Fractions. Simple Reduction, Formulae. Double and Triple Integration. Applications of these in finding Areas, Surfaces, Volumes. Centres of Gravity and Moments of Inertia. Fourier Series and Elements of Harmonic Analysis.

Graphic Integration. Application to Engineering problems.

Differential Equations—Equations of the First Order. Special types of second order equations. Linear Equations. Practical Problems involving differential equations.

Mechanics—Resultants of Force Systems.

Equilibrium of force Systems.

(2) *Applied Mathematics*

Resultant and equilibrium of Force systems. Pulling resistance. Belt friction. Virtual work and its applications, centre of gravity. Wrench screw. Central axis. Common Catenary and suspension bridge.

Motion of a particle in a straight line and a plane constrained motion and pendulums, simple and cycloidal. Small oscillations, easy cases of impulsive forces.

Moments, products, principal axes of inertia. Motion of a rigid body. Relation of torque and angular acceleration. Compound pendulum. Instantaneous centre. Moment of momentum, Kinetic energy of rotation. Applications of the principle of impulse and momentum.

Hydrostatic machines. Barometer, Diving Bell. Pumps, condenser. The equation of continuity. Stream lines. Velocity potential. Irrotational and rotational motion in two dimensions. Formulae. Hydrodynamic equations. Current function. Sources and sinks, Double images. Conformal representation.

(3) *Applied Mechanics*

Papers—I and II

Linear and angular velocity and acceleration. Momentum. Centrifugal force.

Work. Principle of work applied to machine. The relation between load, effort, friction and efficiency of a machine. Perfect machines. Power. Energy. Kinetic energy of rotation and translation. Distribution of energy in a flywheel.

Friction on dry surfaces. Approximate law. Experiments and results. Inclined plane. Angle of repose. Friction of an inclined plane and screw. Screw jack. Clutches. Friction of an axle. Friction of pivots and collars. Work and power lost due to friction in a journal.

Transmission of motion and power by belt and ropes. Effect of friction and centrifugal force on spur gearing. Friction wheel. Meshing of bevel wheels. Friction of wheels. Herringbone and bevel gear.

Governors Porter governor (neglecting the mass and weight of arms)
Spring loaded governor Hartnell governor

Bending moment and shear force diagrams Simple bending and stresses due to the same Neutral axis Moment of resistance The relation between load shearing force bending moment curvature slope and deflection Simple problems on deflection of cantilevers and simply supported beams

Columns and struts Euler's and Rankine Gordon formulae Effect of end fixing

Shear stress in solid and hollow circular shafts Angle of twist

Power transmitted by a shaft subjected to pure torsion Close coiled helical spring of circular section subjected to axial load

Water in motion Bernoulli's Theorem Flow of water through small orifices and the time required to empty a tank Large orifices Flow through pipe Loss of head due to friction Loss of head due to sudden enlargement and sudden contraction Hydraulic mean depth and hydraulic gradient Flow through a rectangular notch Chezy's formula Dynamic pressure of jet on fixed and moving plate

(4) Heat engines

Paper I (Steam Section)

Paper II (Internal Combustion Engines)

Boilers—Types and classification construction details Power rating equivalent evaporation Efficiency Boiler mountings and accessories

Combustion and economy of steam raising forced and natural draught

Care and maintenance Inspection Regulation

The Boiler Act

Thermodynamics—Laws of gases internal energy and external work Entropy Energy diagrams and their application

Steam Engine—Engine construction details simple and compound engines valve diagrams Valves and link motions condensers governors Evaporators Pumps Elementary theory and Power output of engines

Internal Combustion Engines Construction details types performance Hemenay Theory ideal and actual cycles

Producer gas Description of Producer gas plant uses of Internal combustion (Oil Petrol Gas) Engines as Prime movers for power plant Comparison of steam plant with oil and producer gas plant in relation to their initial cost running and maintenance cost

() Electrical Engineering

Papers—I and II

Electromagnetism—Magnetic circuit Lifting magnets Interaction between magnetic field and current carrying conductor Induced Electromagnetic force Inductance Storage of energy in magnetic field Electromagnetic machines

Solenoids and electromagnets, laws of magnetic pull lifting and holding magnets Magnetic brakes and clutches Design of simple electro magnets

Direct current generators—Armature winding progressive and retrogressive windings, simplex winding, pitches, equalisers or bucking rings

Theory of commutation resistance and e m f commutation Inter poles

Armature reaction effect of armature reaction on commutation

Characteristic curves regulation and percent reg of over compounding

Parallel operation of D C generators load division

Switch boards for D C generators and feeders including air break circuit breakers and horn gap lightning arresters

Direct current motors Speed and torque formulae armature reaction motor starters and controllers, grading of starting resistances, load characteristics, speed control by various methods, uses of different types motors

Losses heating effects, rating and efficiency of D C machines and their inspection, erection and management

Battery and feeders boosters

Electric lighting Units and standards, laws of illumination, illumination calculation effect of reflection and absorption relative advantages of various types of illumination interior and exterior illumination cost of lighting

Incandescent lamps, their mechanism and use

Photometry

Different types of internal wiring systems, calculation of size of wire wiring rule and regulations arrangement and selection of main switchboard distribution board branch switches cut outs fuses and other accessories different types of appliances for decorative purposes testing of wiring and electrical fittings

Jointing of metal parts of installation and protection from shock

Alternating currents Generation graphical representation of alternating quantities phase difference and frequency maximum average and effective values sine wave representation effect of inductance capacity resistance reactance and impedance power and power factor Choke coils Permittance and capacity in series and in parallel Potentials

Mutual inductance Skin effects

Polyphase currents—star and delta connections Power in balanced and unbalanced circuits

Inductance and capacity of transmission lines Growth and decay of current in inductive circuit with constant applied P D field strength resistance charging and discharging currents in a series circuit with series resistance only Energy stored in magnetic and dielectric circuits

Heating—Construction theoretical principles of heat loss Surface and polyphase relative efficiency of various electrical heaters etc

of armature winding Star and delta connections Behaviour on load
Parallel operation Load division Synchronising

Transformers—Construction shell and core types Principle and theory of action Mutual Induction effect of leakage flux Equivalent reactance resistance and impedance Vector diagrams Efficiency by direct indirect and regenerative methods Regulation Methods of cooling

(1) Machine Drawing

Keys and cotters Rivets and rivetted joints Pipes and pipe joints Expansion joints Shafting and shaft couplings Pedestals and Plummer blocks Wall and roller bearings Ling-oiled bearings Hangers and brackets Wall boxes Footstep bearing Countershafts Pulleys and speed cones Spur and bevel gears

Water gauge cocks Safety valves Junction valves Feed check valves Isolating valve Blow off cocks

Feed pumps Injectors Reducing valve Steam trap

Detail Drawings of the Dismantled Parts of various types of Engine Machinery Parts

Assembly Drawings from Dismantled Part Drawings

Designs Determination of the general dimensions for a single cylinder steam engine the indicated horse power the speed and the steam pressure being given

Tracing and blue print All drawings must be finished in pencil A few of them will be traced on tracing cloth and prints taken on ferro pruu late paper

Note book Drawings from sketches will not be considered if the corresponding sketches are not found together with other necessary particulars in the student's own note book and sketch book

(7) Structural Geometry and Graphic Statics

Geometry of mechanisms Cams Velocity and acceleration for simple mechanism

Lami polygon and its applications Graphical representation of moments and couples and problems relating thereto

Roof trusses braced cantilevers and braced girders of force in structures due to dead loads and to wind any treatment of suspension bridges

Bending moment and shearing force diagrams in lined beams Simple cases of fixed and continuous problems on rolling loads Moments of inertia of various sections and of reinforced concrete sections

Determination of forces in shear legs truss

Three hinged arches Determination of reaction and vertical components bending moment shear in an arch Determination of the resultant thrust arch Curve of equilibrium

Critical determination of forces in the portals for horizontal wind load

Rivets and rivetted joints Dimensions of structural purposes Relation between the no

and the diameter of rivet holes Grip of a rivet and the length necessary to form a rivet head Distance between the centres of two adjacent rivets and the edge distance Net area for tension Working stresses of structural steel in tension compression, shear and bearing Single shear, double shear, and bearing values of rivets Simple riveted joints Lap joints Butt joints Design of simple joints, where three or four members meet, given the forces acting in the members Splicing of angles, tees, channels joints and simple built up sections

Third Year Course

(1) *Strength and Elasticity of Materials*

(Common to Mechanical and Electrical Engineering Sections)

Materials of construction Physical mechanical and chemical properties

Ultimate strength of materials, working stresses and factor of safety

Strength and stiffness of beams and shafts Composite construction

Deflection of beams analytical and graphic methods, fixed beams, columns eccentric loading Complex stresses Principal stresses Circular shafts Combined bending and twisting

Thick cylinders under pressure Resilience in shafts beams and springs, strain energy application

Testing machine, and appliances for determination of elastic constants

(2) *Theory of Structures*

(Common to Mechanical and Electrical Engineering Sections)

Statically determinate frames stresses in frames and trusses Rivetted and pin joints Deflection of simple framed structure Displacement diagrams

Traveling loads Influence lines for beams suspension bridge Hinged arches their simple treatment Retaining walls Cullage Foundations

Reinforced concrete beams and columns

Design of roof trusses Plate Girders

(3) *Hydraulics*

(Common to Mechanical and Electrical Sections)

Pressure on surfaces immersed in water

Floatation Buoyancy, Stream line motion Bernoulli's Theorem

Flow of water through orifices flow over weirs and spillways Submerged orifices and weirs

Fluid friction and flow of water in pipes

Flow of water in channels

Impacts of water on surfaces and rigid bodies, water jets, The principle of reaction and impulse turbine Specific speeds Efficiency

Free and forced vortex Simple machines and their efficiency General theory of pumps and turbines

Hydraulic ram, lift pump, etc.

(4) *Heat Engines*

(Common to Mechanical and Electrical Engineering Section)

Steam engines—The first and second year work carried to more advanced stages Radial valve gears

Steam turbines—Principle of action of steam in turbines Classification simple impulse turbine pressure compounded and velocity compounded turbines impulse reaction Parsons turbine

Use of temperature—entropy and total heat—entropy charts in the study of steam turbines

Flow of steam through nozzles Critical pressure Calculation of nozzle dimensions Maximum discharge of saturated and superheated steam

Flow of steam through turbine blades Velocity diagrams Work done on blades per pound of steam Efficiency and efficiency ratio Axial thrust and balance pistons Turbine details diaphragms glands and packings Oil relay governor for turbines Emergency governor Condensers Dalton's laws Effect of air pump capacity on vacuum

Internal combustion engines Calculation of main dimensions The ideal and actual efficiencies of internal combustion engine cycles The dual combustion cycle Heat balance sheets Carburation Ignition Valve timing and cam design Principles and peculiar features of the Diesel engine Governing of internal combustion engines The suction gas producer

Air compressors and motors Thermodynamic efficiency Multistage compressors

Refrigeration Theory of vapour compression refrigeration machines Reversed Carnot's and Rankine's cycles choice of working agent Coefficient of performance

(5) *Electrical Engineering*

(Common to Mechanical and Electrical Engineering Section)

PAPER I

A.C. Theory—Symbolic vectors and complex quantities their application to A.C. network Harmonics and their effect Polyphase systems Locus diagram

Transformers Principle Induced E.M.F. Equivalent circuits Losses Output and efficiency Regulation parallel operation special connection Autotransformers

Alternators Single and Polyphase machines Flux distributor winding distribution factor Induced E.M.F. Harmonics Armature reaction Synchronous Impedance Load Characteristic Voltage regulation Parallel operation

Synchronous Motor Theory of operation characteristics Power factor improvement Starting

Induction Motors Construction, action and performance of single and polyphase motors Speed control A C commutator motors, their theory construction and applications, Speed control etc

Special appliances—General principles construction and operation of balances, Boosters Phase advances, frequency changers, Converters and Rectifiers

Electrical Engineering Paper II

Construction and operation of different types of Indicating Instrument

Uses of Ammeters voltmeter, wattmeter Power—factor—meters, for single and Polyphase operation Frequency meters, Synchronoscopes and Synchronizers

Integrating meters for Direct current and single and Polyphase A C system their operation Errors and adjustments Testing of meters

Instrument Transformers, operation grades of accuracy sources of error, testing

General arrangement of Test Rooms Test room methods

Potentiometers and calibration of measuring Instruments

Bridges and Bridge measurements Oscillographs

Measurements and tests on Electrical machines

(6) Theory of Machines

(Common to Mechanical and Electrical Engineering Section)

Dynamics of machinery Effort and velocity, acceleration valve gears quick return motion shaping and planing machines Diagrams

Piston velocity and acceleration diagrams Inertia of reciprocating parts, Crank effort diagram Fly wheel Governors Porter, Spring Sensitiveness power effort Hunting Loaded brakes and Dynamometer

Belts rope and chain gearings Toothed wheels bevel gears Epicyclic trains and their applications Cams and followers Clutches Universal coupling, Oldham's coupling, Elliptic Levers Sliding and rolling friction

Dynamical balancing of rotating masses

(8) *Theory and Design of Electrical Machinery*

(For Electrical Engineering Section only)

The Magnetic circuit Saturation curves

Interpole theory The shunt series and interpole

Armature conductors and Armature windings

Armature reaction and commutation

Losses and Efficiency of a D.C. Machine

Rating of D.C. Machines Heating Methods of cooling

Types and Construction

Motor starters Regulators simple design problems on A.C. Machinery

• Preliminary considerations in various electrical projects Theory of winding

SYLLABUS**Fourth Year Course***(1) Strength and Elasticity of Materials*

(For Mechanical Engineering Section only)

Stress and strain in two and three dimensions Continuous beams
Theorem of 3 moments and its application Columns under axial Eccentric
and lateral loads Unsymmetrical bending in beams and columns

Compound cylinders strain energy elastic deflection by strain energy

Principle of least work and its application to beams columns and
shaft

Fatigue

Heat treatment of steel

Specification of materials

(2) Theory of Structure

(For Mechanical Engineering Section only)

Estimation and distribution of dead and live loads and effect of wind
pressure Working stresses suitable for members subjected to fluctuating
loads

Lattice girder bridges Influence lines for forces in the various
members of a lattice girder Maximum force due to the combined effect of
dead load live load and impact Reversal of force Maximum pressure
on a cross girder Method of stress coefficients applied to a lattice girder
Cantilever bridges

Design of beams ties and struts Design of joints Eccentric load
on a group of rivets Design of lattice girder bridges

Redundant frames Principle of least work Swing bridges

Stiffened suspension bridge. Three pinned arched ribs and spandrel arches subjected to dead and live loads

Two pinned arched ribs Hingeless elastic arch Portals with and without hinges at the base

Dams Retaining walls effect of surcharge Footings and foundations

Reinforced concrete beams with tension, compression and shear reinforcements Reinforced concrete columns

(3) *Hydraulics and Water Power Engineering*

(Common to Mechanical & Electrical Engineering Section only)

Bernoulli's theorem for compressible fluids Venturimeter for gases

Viscosity, Critical velocity Reynold's criterion Flow of viscous fluids through pipes

Principle of dynamic similarity and its applications Dimensional homogeneity Resistance of immersed bodies Boundary layer theory

Non uniform flow in open channels Standing waves Back water functions

Water conduits Tunnels and pipe lines Penstock Expansion joints Anchorage

Water hammer Gradual closure, sudden closure of valve Stand pipes Simple and differential surge tanks

Hydrology Catchment areas Watersheds Rainfall and its fluctuations, average rainfall on an area Factors affecting run off, evaporation, ground storage, Flood flows, frequency studies

Gauging of stream flow Instruments and methods

Hydro-electric schemes Reconnaissance and survey of sites Selection of sites, Causes of failure of water power schemes Recent developments Study of Indian installations

Water power reports Care, operation and maintenance of hydraulic and hydro electric installations

Power available, Primary and secondary power, Estimation of power without storage Storage and pondage Storage reservoirs Mass and duration curves Auxillary and reserve plants

Dams Types and description Economic height Stability calculations Expansion joints Head water control Flash boards Crest gates Spillways

Schemes for low, medium, and high heads Classification of turbines Impulse reaction and mixed flow turbines Specific speed and characteristics curves of turbines Construction Model Test Governing of turbines Safety devices and runaway speeds Draft tube Turbines

Pumps Multiple impeller centrifugal pumps friction losses speed head efficiency and characteristic curves Similar pumps Specific speeds Methods of balancing the end thrust Vortices

Acceleration in reciprocating pumps. Effect of air vessels on the suction and delivery sides

Well sinking Tube wells Air lift pumps

(4) *Theory and Design of Machines*

(For Mechanical Engineering Section only)

Design of machine and structural parts of statically indeterminate forms Inertia stress in rods of uniform and variable sections

Design and drawing of a complete set of machinery such as —Steam engine gas engine crane pumping machinery air compressors including problems of primary secondary and tertiary balancing of rotating and reciprocating parts of machinery

(5) *Heat Engines*

(For Mechanical Engineering Section only)

Paper—I (Steam Section)

Paper—II (I.C. Section Refrigerator Air Compressor)

Steam turbines —The effect of internal losses on the expansion curve of the actual turbine Effect of friction in multistage turbines Reheat factor Relation between reheat factor internal efficiency and stage efficiency of turbines Condition curve and its location on the H chart Supersaturation in steam turbines degree of undercooling and the Wilson curve

Recent developments in steam turbine practice High pressure and temperature The Benson cycle and the Benson critical pressure boiler Reheat cycle Regenerative feed heating by tapping of steam from the main turbine Bleeding for manufacturing processes Binary vapour cycle The Multiehaust system Low pressure and mixed pressure turbines Heat accumulators

Condensers Grashof's equation for mean temperature difference Resistance to heat flow Integral air-cooling chambers Outstanding features of important modern makes of surface condensers Cooling towers Evaporative condensers Steam air ejectors

Air compressors Power transmission by compressed air

Refrigeration Properties of ammonia carbon dioxide and sulphur dioxide The theoretical maximum coefficient of performance Absorption refrigerators

Thermodynamics Perfect differentials of thermodynamics Clerk Maxwell's four fundamental thermodynamic relationships Specific heats Throttling at constant total heat The Joule Thomson cooling effect Callendar's equation for steam Steam table and their uses

Internal combustion engines Volatile liquid fuels Detonation Rating of fuel Characteristics of high speed heavy oil engines compared with carburettor engines Combustion phenomena Ignition lag Effects of air density temperature engine speed and turbulence on ignition lag

(6) *Workshop Technology and Engineering Production*

(Common for Mechanical and Electrical Engineering Section)

Raw materials used in Engineering practice standard forms of metals costs

Engineering processes pattern making foundry work, smithy and forge Location and layout of manufacturing plants The drawing office, estimation of materials and costs The Planning Departments, graphical and statistical control

Rate fixing time and motion study Wage payments Metal cutting tools, speeds, feeds, profile clearance

Machine efficiency, the milling machine Lathes Drills Planers, etc Grinding Practice, grade and grain Abrasives and grinding wheel speeds Standardization limits gauges, Inspection methods

(7) *Industrial Organisation and Management*

(Common for Mechanical and Electrical Engineering Section)

Types of business enterprises, Joint Stock Companies their formation working and winding

Principles of organization, Kinds of organization

Planning of production Manufacturing Instruction Drawing specification and assembly charts Scheduled programme Control board and progress charts Stores and store purchase

Sales organisation and Tendering Import and Export Trade

Forms of Money Banking Foreign exchange

Financial statements valuation and depreciation Costing Records of cost

Book keeping-Profit and loss accounts Balance sheet and auditing

(8) *Generation and Distribution of Electric Power*

(For Electrical Engineering Section only)

Generation—Choice of site of station the various determining factors The choice of prime movers and the choice of arrangement and operation of plant Economics of power generation System of supply to power station auxiliary Excitation system Voltage regulation Switchgear circuit breakers for low, medium and extra high voltages Isolating and transfer switches Line inductances Arrangement of switch boards bushings switching equipment Protection of alternators and transformers against overcurrent, over voltage and leakage Instruments and synchronising apparatus Incandescent, arc and fluorescent lamps Calculation of short circuit current

Distribution—System for distribution of power by direct and alternating currents the applicability of each to various conditions network calculations choice of feeding points sectionalisation of network Substations necessity for types available functions of the arrangement of plant Determination of insulation resistance and localisation of faults Protective systems Selection of converting plant Electricity tariff Electricity laws Cost

(9) *Transmission of Electric Power*

(For Electrical Engineering Section only)

Power Transmission Scheme System of transmission of Power by D.C. and Alternating current

Overhead lines Inductance and capacity effects and their consideration Potential and Potential gradient Corona Mechanical construction of overhead lines

Underground cables Grade and Class Stress Capacity grading sheath effect Thermal characteristics Dielectric loss Interference with neighbouring circuits Cable laying and jointing

Calculations of long and short lines Economic voltage drop Voltage transient surges Insulated and Earthed neutral in H.V. System

Voltage stability and voltage control of Transmission line

Protection of line protective device Relays and Relay system Lightning effects Arresters and other safety devices

Transient electric phenomenon Resonance Travelling waves Symmetrical components Application

Grid working

(10) *Electrical Communication*

(For Electrical Engineering Section only)

Theory of propagation of telegraphic and telephonic currents along wires and cables

Principles of transmitters receivers and repeaters Automatic exchange

Damped and undamped oscillations Aerial and feeder lines Direction finding

Radiation and propagation of Electromagnetic waves Ionosphere

Theory of Thermionic valves Detectors Amplifiers Oscillators Filter circuits

Modulation of Electromagnetic waves Valve transmitters Master oscillators

General theory of radio reception High frequency measurements Wave meters Valve voltmeters Cathode ray cinematography

Regenerative and superheterodyne receivers Automatic volume and frequency control Atmospherics

Photo-electric cell their use in sound recording and reproduction

General principles of television

(11) *Utilisation of Electric Power with Traction*

(For Electrical Engineering Section only)

Scope of utilization of Electrical power for Domestic and Industrial use
Electric Heating, furnaces welding etc.

Selection of Motors with reference to service, speed control and duty
Electric lifts, cranes, pumping motors

The electric drive for Industrial purposes i.e., steel cement textiles, paper and sugar mills

Electric equipment in mines

Electric Traction System of supply, Choice of Voltage, Feeding and Distribution

Traction Motors Types of D.C. and A.C. Motors, their method of control, Mechanism of transmission of power to wheels in trams buses trolleys etc

Illumination, Interior lighting Flood lighting street lighting, Gas discharge lamps Neon Tubes

Application of Electric Energy to cottage industries

(12) *Theory and Design of Electric Machinery*

(For Electrical Engineering Section only)

Synchronous Machines — Theory of winding, Harmonics in L.M.F. waves and their method of suppression

Distributed pole rotors field design mechanical stresses Losses efficiency and Regulation Heating and ventilation

Rotary Converters — Copper losses in armature Rating Heating Armature reaction Regulation Field ampere turns Commutating poles,

Induction Motors and Generator — Stator windings details and calculations Reactance and resistance Simple and modified circle diagrams Potors and Rotor windings

Transformers — Different Types, Ratings, method of Ventilation and cooling Losses Efficiency and Regulation Core and coil construction Method of assembling

Special Machines — Commutator motors, various types of rectifiers

- I —Siemens dynamometer for measuring current 0 -10 amps
0-50 amps
 - II —Self inductance standards
 - II —Mutual inductance standards
 - II —Standard condensers (Air)
 - III —Drysdale and Tinsley Inductance and capacity bridge
 - III —Kelvins Double Bridge
 - III —Vibration Galvanometers
 - III —Drysdale and Tinsley A C Potentiometer complete
 - II —Raphael Fault Lokking Bridge Murry loop Test apparatus
 - II —Platinum Resistance Thermometer
 - III —Recording Voltmeter 200 Volts
 - II —Maximum demand indicator
 - II —Different types of meter
 - III —Different types of relays for overload faults etc
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- V —High Tension Testing outfit
 - III —Telegraphy and Telephony apparatus
 - III —Radio communications

